THE RELATIONSHIP BETWEEN TECHNOLOGY INTEGRATION READING INSTRUCTION AND READING ACHIEVEMENT IN HIGH-PERFORMING CAMPUSES AS REPORTED BY PEIMS AND THIRD GRADE CLASSROOM TEACHERS IN SELECTED SOUTH TEXAS SCHOOL DISTRICTS

A Dissertation

by

HILARIA BAUER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2005

Major Subject: Educational Administration

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Approved by:

Chair of Committee,	Stephen L. Stark
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ABSTRACT

The Relationship Between Technology Integration Reading Instruction and Reading Achievement in High-Performing Campuses as Reported by PEIMS and Third Grade Classroom Teachers in Selected South Texas School Districts. (December 2005)

Hilaria Bauer, B.A., St. Mary's University;

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Chair of Advisory Committee: Dr. Stephen L. Stark

The purpose of this study was to investigate how the implementation of technology in the classroom impacts third grade readers with high reading scores in the Texas Assessment of Knowledge and Skills (TAKS). The secondary purpose was to investigate the degree of teachers' technology integration in the third grade classroom, including the use of computers, to increase literacy levels and teachers' awareness of the overlap between the state's reading and technology standards. The population of this study included 100 teachers from high-performing campuses in the following South Texas independent school districts: Brownsville, McAllen, and Pharr-San Juan-Alamo. Quantitative correlational techniques were used to address the purpose of the study.

The following are the major findings of this study:

1. There was a positive relationship between the teacher skill level and the level of technology integration in the classroom across all 60 respondents,

leading to the conclusion that the districts are experiencing a developmental progression in teachers' acquisition of knowledge and fluency regarding technology skills and technology integration in the classroom.

2. The data revealed that teachers use technology more frequently to do administrative record keeping and to communicate with other colleagues rather than for direct classroom integration, such as lesson design, instruction enhancement, and communication with students and parents.
3. Participants' responses provided some possible explanations for the status of technology use across districts, listing as possible reasons lack of time for professional development in a variety of applications and for teachers to preview different kinds of software. They also mentioned lack of access to computer connectivity provided by school/district, peripherals and software, and other technology, and lack of technology support available to teachers in the classroom.
4. Teachers are familiar with the state's technology standards and are gradually making efforts to integrate technology while they teach the state standards.

The study concluded by presenting a series of recommendations to improve teachers' technology skill levels and the level of technology integration in the classrooms. The findings of this study have implications for district-level decision-making and site-level considerations in the use of technology in the reading classrooms.

DEDICATION

This dissertation is dedicated with all my love to my two beautiful daughters, Nastashia Bauer and Ariel Bauer, who have supported my work and have inspired me to serve youth and to my amazing husband, Oscar Bauer, who has been the best partner anyone can ever wish to have.

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CHAPTER I

INTRODUCTION

One of the challenges facing America's schools is the empowerment of all children to function effectively in their future, a future marked increasingly with change, information growth, and evolving technologies (International Society for Technology in Education[ISTE], 2000). The technological revolution centers on computer information, communication, and multimedia technologies and is often interpreted as the beginnings of an "information society" and, therefore, ascribes education a central role in every aspect of life. This Great Transformation poses tremendous challenges to educators to rethink their basic tenets, to deploy the new technologies in creative and productive ways and to restructure schooling to respond constructively and progressively to the technological and social changes now encompassing the globe (Kellner, 2003).

As a result of this challenge, American schools were furnished with new technologies; today nearly every single school in the U.S. is connected to the World Wide Web. For example, student access to Internet-connected computers (as indicated by student to computer ratios) improved from 20 students per computer in 1998 to 5.6 students per computer in 2002 (Ansell & Park, 2003). However, 20 years and billions of dollars since the first personal computers were plugged into the nation's schools, policymakers and the public are finally starting to demand evidence that their investments in education technology have been worthwhile (Trotter, 1998).

The style for this dissertation follows that of *The Journal of Educational Research*.

As a society, technological literacy has become as important as the traditional components of literacy (Morrison, 1996). Recognizing that the electronic age spawns new technologies, different literacies, and social practices is the foundation to understand a range of factors impacting on computer-mediated learning experiences for students (Kimber, Pillay, & Richards, 2002). To be fully literate is to have the disposition to engage appropriately with texts of various types in order to empower action, feeling, and thinking in the context of purposeful social activity (Casey, 1997).

Recent statistics indicate that teachers want and need to learn how to use classroom computers more effectively (Labbo et al., 2003). While student access to Internet-connected computers rose, at least 50% of veteran and new teachers identify themselves as educational technology novices, and only 42% of new teachers recently stated that they feel well prepared to use computers instructionally (Office of Social and Economic Data Analysis [OSEDA], 2003). There is some evidence regarding teachers who are comfortable with their existing teaching strategies, and who seem to fear “losing face” before “computer-compatible” students. Leu and Kinzer (2000) argued that while the strength of these feelings might vary between individuals, they do tend to mirror some of the major staff objections to integrating technology into their practice. Since most of the schools have access to computers, then the goal becomes one of finding ways to increase levels of participation in computer-mediated learning. To reframe teacher attitudes and increase levels of participation in technology, notions of fear and apathy need to be addressed (Kimber et al., 2002).

Administrators and teachers have gradually adopted goals for literacy instruction that treat new digital technologies on their own terms rather than simply as extensions of print-based literacy. For example, early on, many schools recognized the need to integrate word processing into instruction in a systematic way, although this awareness was typically linked to creating conventional printed documents. Now, not only are there many more examples of teachers using word processors, there are increasingly more examples of combining word processing with multimedia presentation software such as Power Point to engage students in creating multimedia documents for classroom projects, which often include the World Wide Web (Reinking, Labbo, & McKenna, 2000). Nevertheless, teachers face a unique challenge integrating computers into their curriculum in meaningful ways (Pastor & Kerns, 1997).

Another risk research has pointed to is the lack of congruency when implementing computer applications in the classroom, the embedded curricula, and teaching methods. Although the lack of harmony between embedded and existing curricula and teaching methods did not appear to concern most teachers in one study, the analysis indicated that these differences hold the potential to affect learning, and sometimes the consequences appeared negative (Miller, De Jean, & Miller, 2000)

In order to better understand the impact of the use of technology in reading achievement, an analysis of teacher technological integration in the classroom is needed. In the case of literacy research and instruction, it is useful both to acknowledge and to consider that there are different levels and types of technological integration that can be achieved (Reinking et al., 2000).

Statement of the Problem

Knowing whether expenditures on technology promote the attainment of knowledge or intellectual skills, whether the kind measured by more traditional standardized tests or the kind suggested by reformers, is clearly of the utmost importance (Schofiled, 1999). However, the speed and increasing sophistication of technology accentuate the need for students to cope with different modes of representation in accessing and processing information, and developing more critical understanding of these different texts (Kimber et al., 2002). Thus, there is a need to understand the impact of new technologies and their use in the classroom on reading scores. In addition, while most teachers recognize the changing nature of literacy practices, issues of confidence, access, and application remain crucial factors in their framing of teaching practices (Kimber et al., 2002). After two decades of trying to implement technology plans in public schools, a more-nuanced discussion of classroom technology – one that emphasizes the circumstances under which it is most effective – is long overdue (Trotter, 1998).

Purpose of the Study

The primary purpose of this study was to investigate how the implementation of technology in the classroom impacts third grade readers with high reading scores in TAKS. The secondary purpose was to investigate the degree of teachers' technology integration in the third grade classroom, including the use of computers to increase literacy levels, and teachers' awareness of the overlapping between the state's reading and technology standards.

The study was guided by the following research questions:

1. Is there a relationship between levels of technology integration in reading instruction and TAKS reading achievement for third grade students in high-performing campuses as reported by PEIMS in selected elementary schools in South Texas?
2. To what extent is technology used in instruction with third grade students in high-performing campuses in selected elementary schools in South Texas?
3. What factors support the practice of technology integration for third grade students as reported by teachers in high-performing campuses in selected elementary schools in South Texas?
4. To what degree is the integration of state technology application standards applied in planning of third grade reading instruction as reported by teachers in high-performing campuses in selected elementary schools in South Texas?

Operational Definitions

Factors: The different support systems teachers need to integrate technology into the curriculum, including access to hardware and software, professional development, and administrative support for technology integration in the classroom.

High-Performing Campuses: Campuses identified as Recognized or Exemplary by the Texas Education Agency, and their reading scores are at or above 85%.

Instruction: The delivery of the state standards during a lesson.

Levels of Technology Integration: The use of a variety of technological tools and practices, including Integrated Computer Systems (ICS's) for drill and practice, project-based activities using the Internet, etc.

Public Education Information Management System (PEIMS): A statewide reporting system whereby school districts provide information on district organizations, finances, staff, and students to the Texas Education Agency (TEA). TEA determines what specific data districts must provide and what format must be used when reporting that data.

Reading Achievement: Student reading performance as measured by the Texas Assessment of Knowledge and Skills (TAKS).

Selected South Texas School Districts: Four major districts along the United States-Mexico border.

State Technology Standards: A general set of profiles describing the technological knowledge and skills technology-literate students must be able to demonstrate at key developmental points in their pre-college education.

Teacher Practice: Includes the comprehensive work of teachers such as planning, development of materials, instructing, monitoring, informally and formally assessing, and reflecting and learning opportunities such as professional development.

Technology Integration Reading Instruction: The infusion of technology as a tool to enhance reading instruction in the classroom.

Texas Assessment of Knowledge Skills (TAKS): Criterion-reference test required by state law since the fall of 1990. Texas students are assessed in Reading and Math in grades 3-8 and 10. TAKS writing is administered in grades 4, 8, and 10.

Third Grade Classroom Teachers: Self-contained teachers teaching third grade standards.

Assumptions

1. Teachers understood the purpose of the questionnaire and answered to the best of their ability.
2. The interpretation of the data accurately reflected that which was intended.

Limitations

1. Findings from this study may not be generalized to any other group than the elementary schools in the study.
2. Only 2003-2004 TAKS data were considered.
3. The study was limited to third grade teachers in the campuses that met the achievement criteria.

Significance of the Study

Texas appropriated $110,000,000 for educational technology in 1998. Yet, the little research that has been conducted so far on the effectiveness of technology in the classroom reveals mixed conclusions (Trotter, 1998). This number has increased to

$151,000,000 by 2004 (Texas Education Agency [TEA], 2004). Many teachers are not sure what is the best way to utilize computers in their classrooms, and in the state, there is no requirement for teacher preparation that includes technology education (Zehr, 1998).

This study examined the impact of the use of computers on third graders' TAKS performance in South Texas. The data gathered and analyzed will assist educators and researchers to identify best practices to ensure the success of all students. In addition, the study provided some information about the use of computers with elementary students. Since there is so much to be learned about the use of computers in the classroom, the study provides some information on the area, as well as to define future areas of study.

Contents of the Dissertation

The dissertation is organized into five major divisions or chapters. Chapter I contains an introduction, a statement of the problem, purpose of the study, research questions, operational definitions, assumptions, limitations, and a research significance statement. Chapter II contains a review of the literature. The methodology and procedures implemented in the data collection are found in Chapter III. Chapter IV reports the analysis and comparisons of the data collected in the study. Chapter V, the final chapter, presents the researcher's summary, conclusions, and implications in addition to recommendations for future study.

CHAPTER II

REVIEW OF THE LITERATURE

In this study, the impact of technology integration in third grade reading achievement in selected South Texas elementary schools was examined. This chapter was provided to summarize information through a review of literature related to the constructs contained in this study. This chapter is divided into four main sections. Each section addresses areas that relate to the level of integration of technology in highly effective classrooms, the extent to which technology is used during reading instruction, the factors that support the integration of technology in the reading class, and level of professional development in the area of technology experienced by teachers. The first section provides an overview of how the impact of technology in society has affected public schools. The second section describes the relationship between the use of computers and student performance and achievement in schools. Section three depicts the transforming nature of technology in the modern view of literacy. The state of teacher preparation and professional development in instructional technology is examined in the fourth section.

Introduction

Today, almost every school in America is connected to the Internet. Increasingly, individual classrooms across the country have their own access to the rich resources of the information superhighway. What is more, this remarkable accomplishment has been achieved with amazing speed (National Foundation for the Improvement of Education [NFIE], 2000).

Questions about educational technology and whether “it’s working” continue to rage as our nation grapples with the next steps involved in readying schools for the 21st century. On one end of the spectrum, there are the critics who argue that there is “no research evidence whatsoever” to support claims that technology is worthwhile in schools. On the other end, entire publications such as the *Report on the Effectiveness of Technology in Schools, ‘90-’97* and published by the Software Publishers Association, offer pages of evidence of technology’s positive impact on schools (Salpeter, 1998).

Recent research builds a powerful case against what used to be accepted “truths” about learning and technology. First, there is strong evidence that traditional models of learning, traditional definitions of technology effectiveness, and traditional models of the cost-effectiveness of technology do not work. In place of these old assumptions, researchers are positing new ways of looking at learning that promote:

- Engaged, meaningful learning and collaboration involving challenging and real-life tasks; and
- Technology as a tool for learning, communication, and collaboration. (Jones, Valdez, Nowakowski, & Rasmussen, 1995, p. 5)

The Internet enables education to center learning around the student instead of the classroom, to focus on the strengths and needs of individual learners, and really makes lifelong learning a practical reality (Collins, 2001).

One of the challenges facing America’s schools is the empowerment of all children to function effectively in their future, a future marked increasingly with change, information growth, and evolving technologies (ISTE, 2000). The technological revolution centers on computer, information, communication, and multimedia technologies, is often interpreted as the beginnings of an "information society," and, therefore, ascribes education a central role in every aspect of life. This Great Transformation poses tremendous challenges to educators to rethink their basic tenets, to deploy the new technologies in creative and productive ways, and to restructure schooling to respond constructively and progressively to the technological and social changes now encompassing the globe (Kellner, 2003).

As a result of this challenge, American schools were furnished with new technologies; today nearly every single school in the U.S. is connected to the World Wide Web. For example, student access to Internet-connected computers (as indicated by student to computer ratios) improved from 20 students per computer in 1998 to 5.6 students per computer in 2002 (Ansell & Park, 2003).

While measures to assess a student's technological fluency are not yet developed, it is no longer enough for educators to simply report to policymakers that the public investment in learning technology resulted in a better student to computer ratio or an increase in the number of classrooms wired. Policymakers need more than anecdotes: they need evidence (Lemke, 1998). At the time when the investment started, we imagined that in the schools of the future, there would be virtual libraries used by pupils working on laptop computers, and teachers could be trained in teacher centers that exist only in cyberspace. While technological tools can spur pedagogical changes, the utility of such changes must be measured ultimately by their impact on student learning. We need to understand better the relationship between technology, the level of technology integration in the classroom, and student learning (Reinking, McKenna, Labbo, & Kleffer, 1998.)

As a society, technological literacy has become as important as the traditional components of literacy (Morrison, 1996). Recognizing that the electronic age spawns new technologies, different literacies, and social practices is the foundation to understand a range of factors impacting on computer-mediated learning experiences for students (Kimber et al., 2002).

Lankshear (1997) differentiates between the different discourses and articulations of technology *for* literacy, literacy *for* technology, literacy *as* technology, and technology *as* literacy. To be fully literate is to have the disposition to engage appropriately with texts of various types in order to empower action, feeling, and thinking in the context of purposeful social activity (Casey, 1997).

Teacher preparation has emerged as a critical factor limiting the contributions of new technologies to improved education. There is significant progress in equipping schools with modern learning tools. However, there is a need to accelerate the efforts to develop educators who know how to use these new learning tools to teach 21st century students (Carroll, 2000).

Technology and Student Academic Achievement

One would expect educational research and development (R&D) to foster the ideal use of educational technology – to improve children's learning and to make schools more efficient and productive – but to date, such effects have not occurred

(Baker & O'Neil, 1994). Research on the impact of technology on learning is in its infancy; although there is some solid work emerging (Schacter, 1999).

What do evaluation studies say about computer-based instruction? It is not easy to give a simple answer to the question. The term *computer-based instruction* has been applied to too many different programs, and the term *evaluation* has been used in too many different ways. At least a dozen meta-analyses involving over 500 individual studies have been carried out to answer questions about the effectiveness of computer-based instruction. Each of the analyses yielded the conclusion that programs of computer-based instruction have a positive record in the evaluation literature (Kulik, 1994).

National studies have revealed that students who have access to computer-assisted instruction and other technology-related experiences show achievement gains on various tests (Southern Regional Education Board [SREB], 2002). The West Virginia's "Basic Skills/Computer Education" program is unique in its eight-year longevity and in its documented student achievement outcomes. For example, after the technology enhanced cohort arrived in that grade, statewide third grade CTBS (California Test of Basic Skills) scores went up five points. Prior to that time, those scores had risen about 1.5 points per year, six points in four years. On a national basis, if the achievement scores of various states are "corrected" by income, that is, if the unearned increment of school achievement that states with high per capita income enjoy from the support that privileged families give their children's learning, then West Virginia's test scores improved more than those of any other state. In terms of per capita income, West Virginia is in 40th place: in achievement, it is in 17th place (Mann, Shakeshaft, Backer, & Kottkamp, 1999).

The results of the 1998 Accountability Report to the Idaho Legislature show that the benefits of technology in teaching and learning are clear: increased academic achievement, improved technological literacy, increased communication, innovative teaching, positive relationships with local communities, more efficient operation of schools, and technically qualified students ready to enter today's workforce (Green, 1998). A closer look into the Idaho results reveals a number of findings found when looked broadly across schools, there is a positive relationship between achievement and technology use. Researchers compared achievement based on a school-wide teacher computer use index that included the amount of software teachers use with students and teachers' self-reported software capability. In each case, schools with teachers who used more technology or who had higher computer skills gained more on tests from 1999 to 2000 than other schools (Ravitz & Mergendoller, 2002).

Another study conducted by Jason Ravitz, Jon Mergendoller, and Wayne Rush, explored the relationship that home and school computer use may have with academic achievement. Upon a careful analysis of the data, Ravitz, Mergendoller, and Rush (2003) found a positive relationship between technology proficiencies and student achievement. Within schools, students who have higher software capability not only score higher on tests but they also gained more on average, from 1999 to 2000 (Ravitz et al., 2003).

In February 1996, Union City, a predominantly Latino, inner city community, received national recognition when the President and Vice President of the United States came to acknowledge the extraordinary accomplishments of this urban school district. In grades where curricular reforms were established, students were systematically performing at or above national averages in language arts, reading, and mathematics. Union City students are consistently out-performing other urban and special needs districts in the state by approximately 27 percentage points on the New Jersey's Early Warning Test. This strongly suggests that the new curriculum, coupled with well-supported and judiciously integrated technologies, is making a significant contribution to student performance (Honey & Henriquez, 1996).

The overall model adopted by Peakview Elementary, in Aurora Colorado, included the use of technology in a way sufficient to cause dramatic effects. Students are showing tentative gains in a variety of areas. Their skills at using technology are obviously improved. Some teachers report reading and vocabulary improvements in early grades. Students do more editing and revising of written work using word-processing tools. Spell checkers are only sparingly used by students (Wilson & Peterson, 1995).

The Technology-Rich Authentic Learning Environments (TRALE) project aims to improve young children's literacy skills through the creation of a community of technology enriched classroom environments. TRALE has been implemented in kindergarten through third grade classrooms in one urban elementary school in the District of Columbia, a school located in an area of high poverty, high crime, and much drug use. The school has been identified as one of the city's 20 lowest performing schools. The implementation of the TRALE program, with its emphasis on multimedia computing and an authentic learning environment characterized by a cognitive apprenticeship approach, was studied by determining student achievement, teacher perceptions, and the degree of program implementation by each teacher. TRALE increased student achievement even during its first year of operation (Yekovich, Yekovich, & Nagy-Rado, 1999).

Yet, during the summer of 2001, the District of Columbia's 21st Century Community Learning Center program helped provide computers and software designed to improve the academic success of summer school students from 10 junior high and middle schools in Washington, D.C. In addition to helping to reduce the number of youth left idle during the summer, these activities appeared to have the potential to improve student familiarity with computer technology. The quality and quantity of equipment were high, as was the overall level of exposure to technology. The staff seemed prepared and dedicated, and the students were generally engaged. Although the overall program was impressive, challenges remain. Student outcomes could not be directly measured from the data collected (Liu et al., 2002).

Another meta-analytic study that focused on the progressive comparison of the effects of computer-assisted instruction in the academic achievement of secondary students revealed that when comparing the effectiveness of computer use to that of more traditional methods of instruction, the microcomputer had taken a progressively unfavorable position (Christmann & Badgett, 1997).

Cuban, Kirkpatrick, and Peck (2001) present an even less favorable view of the effectiveness of computers in the classrooms. They conducted a study in two high schools in Northern California and found from administrators, coordinators, teachers, and students about inadequate wiring, servers crashing, and constant replacement of obsolete software and machines, which undermined even the most hardcore advocates of technology prepared back-up lessons just in case of the unpredictable nature of the machines. Despite the dramatically increased presence of information technologies, however, the vast majority of students have school experiences remarkably similar to those of students over the previous 50 years. In the end, innovative technology remains relegated to the periphery and has not made any dramatic inroads into the academic mainstream (Peck, Cuban, & Kirkpatrick, 2002).

The Co-nect model has the distinction of being one of ten nationally recognized comprehensive school reform models that has been endorsed by the New American Schools (NAS). To receive this endorsement, Co-nect had to be research-based and provide documented results that show improved student achievement (NAS, 2001). Co-nect is a research-based school reform model established in 1992. As of Spring 2001, the Co-nect model operated in over 200 schools, 60 districts, and 30 states (Hausman, 2001). In general, Co-nect engendered greater use of technology as a learning tool, but Co-nect schools showed mixed results in raising achievement compared to district and state norms. One of the concerns teachers perceived in Co-nect schools was the incompatibility of statewide standardized testing with Co-nect's focus on higher-order learning. Most teachers felt they had to “stop” Co-nect to prepare students for the state test (Ross & Lowther, 2003).

In Washington state, the degree to which schools have attempted to implement the restructuring process set in motion by House Bill 1209 differs from school-to-school. In fact, while many of the schools have or are implementing many of the same school-wide or classroom practices, there is also a wide variety of practices being used and to varying degrees. However, only very few of these specific practices are related to academic achievement gains, and only one specific practice, outcome or performance based education, is related when the broader definition of restructuring is considered. Many of the classroom practices that have increased the most in use since 1993, such as the use of educational technology and group projects, have no relationship with achievement gains (Fouts, 1999).

There are two important impediments to obtaining defensible, research-based information on the performance of most applications of technology in schools. First, most available tests do not reliably measure the outcomes that are being sought by advocates of technology-rich schools. The measures that are reported are usually from traditional, multiple-choice tests. Second, technology is only a component of an instructional activity. Assessments of the impact of technology are really assessments of instructional processes enabled by technology, and the outcomes are highly dependent on the quality of the implementation of the entire instructional process (Glennan & Melmed, 1996).

Technology and Reading Instruction: A New View of Literacy

Although studies of literacy and technology are gradually beginning to emerge in the research journals of literacy, the paucity of hard data in this area remains all too obvious (Reinking et al., 1998). The task is too large, involves literacy in such profound ways, and must be accomplished so quickly that all literacy researchers need to consider how they might contribute. They should consider bringing their special area of expertise to the study of literacy within the new media of information and communication technologies (ICT) in order to address many issues, but especially the following: What new literacy skills are required by new forms of ICT? How can we best support students in acquiring those new literacies? (International Reading Association (IRA), 2001).

Regular change is a defining characteristic of the new literacies. This simple observation has profound consequences for literacy and literacy education. The continuously changing technologies of literacy mean that students must *learn how to learn* new technologies of literacy. In fact, the ability to learn continuously changing technologies for literacy may be a more critical target than learning any technology of literacy (Leu, 2002).

One area that has drawn substantial research attention has been the extent to which the contexts for new literacies generate greater gains in comprehension and learning (Ayersman, 1996; Chen & Rada, 1996; Dillon & Gabbard, 1998). Most of this work has come from the IT community. Results from the most recent review of work with hypermedia, not Internet, technologies notes the many problematic aspects of this research literature and suggests little or no gains accrue for comprehension (Dillon & Gabbard, 1998).

However, Leu (2002) suggests that efficacy studies may explore moot questions if it is already a fact that the use of networked environments for information and communication will be required in higher education and the workplace. The President's Committee of Advisors on Science and Technology, a prestigious panel of scientists and educational researchers in the United States, took a similar position (President's Committee of Advisors on Science and Technology [PCAST], 1997). The panel argued that ICT and other digital technologies are so central to the future of the United States that additional data on their efficacy were unnecessary before moving to systematically integrate these technologies into schools.

What is important to study are the conditions within new technologies that lead to gains in comprehension and learning. This information can guide teachers and others about how best to use of these new technologies in the classroom. Studying the effects on comprehension and learning between different instructional practices, various individual differences, and different types of tasks, can provide useful information (Leu, 2002).

For example, as computers become increasingly common in homes and schools, many young writers now craft their first sentences on the word processor. Some of these children have even come to rely on the technology for all of their writing and will likely continue to do so for the rest of their formal schooling and adult lives, yet, we know surprisingly little about the how the word processor affects the development of such students' writing when they make routine, sustained use of the technology (Owston, & Wideman, 1996).

As of now, the work in these areas has not yet produced a consistent body of results (Dillon & Gabbard, 1998). Newer technologies with greater opportunity for collaboration, conferencing, and networking experiences appear to be more inviting (Eldred & Hawisher, 1995). In addition, some evidence suggests that the ability to quickly search through hypermedia context favors higher ability students over lower ability students, especially when the information context is very rich (Dillon & Gabbard, 1998).

Another area that has been explored is the effect of task differences on comprehension with new technologies. Some of these tasks require the individual to search for a specific piece of information. Others are far more complex, requiring the user to gather and organize multiple information resources, evaluating their appropriateness as the reader works to solve a complex problem. These are categorized as "open," answering complex questions, and "closed," answering specific questions, tasks. A review of earlier technologies demonstrated that hypertext yielded significantly greater effect sizes for open tasks than closed tasks on measures of effectiveness (Chen & Rada, 1996).

In addition, knowledge about the use of specific types of applications requires attention because they are either common in school classrooms or will be shortly: Skill development software, such as talking storybooks, Integrated Learning Systems (ILS), and the Internet. Talking storybooks are hypermedia texts with digitized pronunciations or words and larger textual units, often with animated illustrations and other features. Integrated Learning Systems are networked systems that provide individual instruction on skills important to different subject areas (Leu, 2002).

Applications

Skill Development Software

Fewer studies have explored the potential of talking storybooks for younger children at the very beginning stages of reading, although a few studies have been done with this population (Lewin, 1997; McKenna, 1998). Moreover, computerized direct instruction significantly augments reading skills like phonological awareness, and computerized speech feedback during independent reading practice augments beginners' skills, with one study showing significant gains over controls on a standardized reading test (Kim & Kamil, 2002). However, in one of the studies, decodable words were equipped with embedded phonics lessons. These brief mini-lessons were fully contextualized and directly based on the onset-and-rime principle, but they had no observable impact on children's knowledge of phonics, even after they had read 20 electronic books (McKenna, 2002)

There are three different types of skill-development software: (a) drill-and practice, (b) tutorial, and (c) learning games. Drill-and-practice programs provide for the practice of content that has already been taught. Tutorial programs teach new information and principles, as well as provide for practice. Learning games usually include drill-and-practice in a format that incorporates some sort of challenge specifically designed to motivate students. All three types of programs have a place in today's classrooms and contribute to skill development when used to meet individual and small-group needs (Fox & Mitchell, 2001).

Reading from computer screens is part of daily life in primary classrooms. There are design issues that are likely to influence the way in which children use interactive multimedia. An important part of a project entitled *Interactive Multimedia in Primary Schools* (IMPS) considered how aspects of screen design affect children's use and understanding of information. Some of the issues that emerged most strongly from IMPS studies were in relation to classroom use, to children's reading activity, and to particular features of interaction or interface design (Walker & Reynolds, 2000). Unquestionably, computer graphics contribute to the reader's ability to form mental images about written and spoken text. However, computer graphics' functional relationship to the text determines their real value. Graphics that give text meaning (organic) or argument the meaning of the text (supplemental), whether written or spoken, contribute to students' meaning making. A functionality framework can assist in analyzing the degree to which graphics support the text and concepts to be learned (Wepner & Cotter, 2002).

Nevertheless, multimedia computer programs may provide promising opportunities for the training of initial reading and spelling skills; two small-scale pilot studies have been conducted with a recently-developed program to examine the efficacy and impact on the motivation of the users. The first study was concerned with the use of the program with kindergarten children (K2). The main finding in this study was that kindergarten readers learned in up to 16 hours of computer practice as much as is normally attained in the first three months of formal reading instruction in the classroom (van Daal & Reitsma, 2000).

There is an explosion of educational software and Web pages that can be used to integrate literacy and technology. A common format used to evaluate literacy software is to employ a series of criteria that can be used to determine the quality of the software. However, the Evaluation Framework helps teachers, administrators, and parents select appropriate software and Web pages and fosters a broader analysis of software – one that recognizes divergent perspectives and stances as they apply to the evaluation of technology. Such evaluations help users make wise decisions about purchasing software and using Web pages that fit their literacy goals (Baker, 2003).

Integrated Learning Systems (ILS)

Another area of research in computer applications is the use of networked information environments such as ILS. They tend to follow a more direct instructional model. The research in ILS does not show many learning gains over other instructional approaches. A large meta-analysis of almost 100 ILS studies showed many methodological flaws and little evidence of ILS gains on achievement (Leu, 2002).

PLATO

Apache Junction Unified School District has embarked on an ambitious five-year program of instructional improvement using technology. PLATO elementary reading and math products were installed in the district's four elementary and two middle schools at the beginning of the 1999-2000 school year. The study focused on the use of PLATO products as part of a four-week summer program targeted to help students who were below grade level in reading and math. An analysis of pretest-posttest scores in all grades showed a generally positive correlation between the level of PLATO program use and posttest student achievement scores: students who used PLATO the most, progressed the most (Quinn & Quinn, 2002).

Accelerated Reader

One study demonstrated the positive impact of school ownership of the accelerated reader (AR) technology-based literacy program on attendance and standardized test scores at a representative sample of 2,500 elementary, middle, and high schools. Based on the results, the report concludes that AR has a positive effect on student academic performance, especially for socioeconomically disadvantaged children in urban areas (Paul, VanderZee, Rue, & Swanson, 1996).

SuccessMaker

Using information gathered from teacher surveys and classroom observation, the year-long study of primary teachers’ and children using SuccessMaker documented areas where the curricula embedded in the ILS were congruent with teachers’ normal curricula and pedagogical practices. However, it also documented numerous instances of incongruity. Although the lack of harmony between embedded and existing curricula and teaching methods did not appear to concern most teachers in this study, the analysis indicated that these differences hold the potential to affect learning, sometimes the consequences appeared to be negative (Miller et al., 2000).

Espresso for Schools

A number of forms of information communication technologies (ICT) provision are now available in schools. In this study, the focus was to evaluate a commercially available product Espresso for Schools and to comment on its effectiveness in terms of meeting national curriculum requirements in both ICT and literacy, in the United Kingdom. Espresso for Schools is an educational multimedia service that delivers, via satellite, broadband educational content on a weekly basis to subscriber primary schools, providing curriculum-focused resources for both pupils and teachers (Watts, Lloyd, & Jackson, 2000). To the extent that both teachers and pupils found Espresso materials useful, interesting, and cost-effective, then the evaluation shows that it "works": it provides general motivation to both teachers and pupils and can demonstrate some small but specific learning gains. To what extent these gains are sustainable, whether or not they can transfer to other parts of the curriculum or to other more generic skills and attitudes, remains to be explored. The unanswered question is whether effectiveness also hangs on the familiarity, comfort, and tolerance with playing "knowledge catch up" with pupils (Watts & Lloyd, 2001).

As technology tools change, techniques for teaching and learning in the classroom evolve. Teachers are taking advantage of technological advances that can be implemented smoothly in the classroom (Castellani & Jeffs, 2001). Underwood presented evidence of learning outcomes in the area of reading from the use of software incorporating two very different styles of learning, structured sub-skills tutoring (using an Integrated Learning System) versus free reading (using a talking book), but which both heavily exploit multimedia presentation. Learning does occur, but differential performance gains compared to more traditional teaching are not assured. Furthermore, these studies suggest that current debates about whole-word versus phonological skills teaching may be overshadowed by characteristics of the software other than the mode of teaching and by organizational choices and constraints such as length of session, selection of participants and grouping strategy that teachers make (Underwood, 2000).

Most studies are formative and summative evaluations of various existing technology applications in education. Little funding has been expended for in-depth R&D for education, especially grades K-12. So far, the emphasis has been more on qualitative research and less on development and validation. Development has occurred by industry but has not been connected to research. Before technology can have a long term impact on education, it is necessary to have a strong R&D agenda that promotes development combined with the needed research to inform the education community and the education stakeholders about effective practices and products (Cradler, 1995).

The Internet

Technology not only has made reading materials easily available, but it also is changing the way in which reading takes place. Hypertext, a computer capability that links information on the screen to stacks of related information, calls for different reading skills than traditional printed text. Today's reading teachers are especially poised for helping students use the technology available to them to help produce meaning (Valmont & Wepner, 2001).

The Internet could be the most powerful technology available to support reading and writing experiences in the classroom. A growing body of research is beginning to recognize the Internet's influence (Garner & Gillingham, 1996). The skills required to comprehend text (expository text in particular) are used when students search the Internet for an answer to a question or just browse from Website to Website. Internet readers are reading expository text in a hypertext format where ideas are connected by links, headings, icons, and graphics. Yet, Internet reading appears to apply similar reading strategies as those used with print text reading (Schmar-Dobler, 2003).

When technology is used as a tool in the classroom, students are learning how to learn; they are learning new skills that will help them both in school and in the workplace; they are learning how to dialogue with professionals and use feedback; and they are motivated to stay in school. RMC Research Corporation's research indicates that using technology, including the Internet, is valuable because it serves the traditionally underserved populations in the schools studied. The products that the students developed were impressive; the skills they developed were significant; and the indirect result on student achievement, if measured by tests like TAAS, will most likely improve (Sherry & Jesse, 2000).

The largest, most systematic work to evaluate Internet use in the classroom is a study of 500 students in grades 4 and 6 in seven urban school districts around the United States. The Center for Applied Special Technology (CAST), an independent educational research and development organization, designed and conducted the study to evaluate the effectiveness of online use, as distinguished from the use of other technologies and curricular reforms, for improved student learning. In sum, increased student learning for students with online use is clearly demonstrated by their performance on student projects and changes in their subjective reports on pre-study and post-study questionnaires. Increased student learning due to online use is further substantiated by teacher reports in telephone interviews (CAST, 1996).

According to “A Report on the Effect of the unitedstreaming Application on Educational Performance” students who received instruction incorporating the video-on-demand unitedstreaming application showed dramatic improvement (Boster, Meyer, Roberto, & Inge, 2002). Experimental groups in third grade science, third grade social studies, and eighth grade social studies showed a significantly greater increase in scores on the posttests over the pretests than did the control groups. No significant difference existed between the eighth grade science group and the control group, a result possibly due to a lag time between the teacher training and implementation for that experimental condition (Center for Applied Research in Educational Technology [CARET], 2002).

The “Digital Divide” takes many forms. Students in Wetzel County, West Virginia, are geographically remote from big city life, and, until recently, school libraries – with out-of-date collections – constituted the main information. School officials adopted a learning approach offered by NETSchools to ameliorate the situation. After only six months, 80% of Hundred High students were accessing the Internet daily. Test scores went up. Over the course of that first year, the 144 students at Hundred High scored higher and ranked above the national mean in every subject, as well as total basic skills, on the Stanford Achievement Test (SAT9) (Kerrey & Isakson, 2000).

Now, the challenge here for schools is (a) how to accommodate into the curriculum the range of skills young people might acquire outside formal education, (b) how to recognize and validate this extended cultural sphere, and (c) how to acknowledge that the various forms of popular culture (e.g. video, the Web, music) have a place in an extended notion of literacy (Sefton-Green, 2001).

If we consider that literacy is a set of practices situated within particular contexts, and any practice of literacy always involves technologies that affect its forms and use, the literature about the role of technology integration in the development of literacy can be categorized in three diverse examples of classroom and curricular practice: drill and skill programs via ICT's for efficiency, the use of ICT's for enhancement and amplification, and the use of ICT's for the transformation of literacy through new genres and new hypermedia literacy practices (Morgan, 2001).

Increasingly, technology is changing faster than our ability to evaluate its utility for literacy by using traditional approaches. In literacy research, for example, it has become difficult, if not impossible, to develop a consistent body of published research within traditional forums before the technology on which a study is based is replaced by even newer technology. Unless this situation changes, it is likely that traditional research will play a much less important role in defining our understanding of new technologies and new literacies. Our understanding of effective literacy instruction may be informed more often by teachers who use continuously changing technologies on a daily basis and less often by traditional forms of research (Leu, Karchmer, & Leu, 1999).

More recently, Kulik (2003) identified important factors that have influenced the change in the way students use computers. Students today most frequently use computers as tools rather than as tutors; most frequent teacher objectives for student use are “to find out about ideas and information” in contrast to a decade ago when the most frequent objectives were “basic skills training and computer literacy.”

As the perception of learners’ changes, from an empty vessel whose job is to absorb as much as possible, to viewing the learner as an inquirer, learning through work on meaningful problems in real situations, technology becomes more significant. For example, Berghoff, Egawa, Harste, and Hoonan (2000) asked what schools would look like if they operated on the assumption that literacy involves a full range of interpretive abilities – not only the capacity to use language. Their work assumed that learners who make meaning, draw on different dimensions of knowing: different forms of expression, different kinds of ideas, and different cultural frameworks. By recognizing and honoring these differences in the classroom, the school can create a richer way to explore the path to knowledge (Bruce & Bishop, 2002).

A New Definition of Literacy

The union of reading and technology on the Internet is causing educators to take a new look at what it means to be literate in today’s society (Leu, 2002). New forms of literacy call upon students to know how to read and write not only in the print world but also in the digital world. Today's definition of literacy is being broadened to include literacy skills necessary for individuals, groups, and societies to access the best information in the shortest time to identify and solve the most important problems and then communicate this information (Leu, 2000). An example of how technology has transformed literacy is presented by the new edition of the curriculum of the Early Literacy Project (ELP). The Early Literacy Project was designed for use in primary-grade classrooms for students with learning disabilities, intended to build literacy skills, and impart learning-learn strategies. Although ELP showed the significant effects of the literacy curriculum on students' reading and writing performance, several issues warranted extensions of the work into literacy applications involving technology. The Web is a flexible technology that is open to multiple interpretations and applications. In this project, the practices and principles of the ELP shaped our interpretations of the Web, defining the Web as an environment for literacy development (Englert, Raphael, & Mariage, 1994). At the same time, the good and bad points of the Web also influenced the realization of the curriculum, resulting in a Web-based literacy environment that was the same as neither the original ELP curriculum nor even the ELP curriculum as was envisioned extending it through CD-ROM technologies (Zhao, Englert, Chen, Jones, & Ferding, 2000).

Teacher Preparation: Are Teachers Ready to Integrate Technology in the Classroom?

Recent statistics indicate that teachers want and need to learn how to use classroom computers more effectively (Labbo et al., 2003). A background question from the 2003 National Assessment of Educational Progress, or NAEP, mathematics test asked teachers how they used computers for math instruction. Although the survey found that 72% of fourth graders had teachers who were using computers in some way for math instruction, an overwhelming majority of students had teachers who were using computers for basic drill and practice or for math games (Park & Staresina, 2004). In addition, 37 states and the District of Columbia have standards for what teachers should know about technology, but fewer require teachers to demonstrate their proficiency with technology through a test or specific coursework ("Survey of state," 2004).

Unlike the gradual change from oral to print culture that took several hundred years, the change to technoculture is happening in a generation, and this is perhaps what alarms most teachers. As new technologies emerge, regardless of historical context, they are ultimately woven into the social fabric of everyday life. The illuminated manuscripts of the past metamorphosed into their modern-day counterparts-multimodal Web screens with a more fluid and dynamic relationship between words, sound and visual. Multimodal texts represent the convergence of modern-day literacy practices and new communications technologies. They herald the realities of new genres, new social and literacy practices, and the need for teachers to rethink whether their pedagogical beliefs and practices do in fact match those of the Knowledge Age (Kimber et al., 2002).

There is some evidence regarding teachers who are comfortable with their existing teaching strategies and who seem to fear "losing face" before "computer-compatible" students. Leu and Kinzer (2000) argued that while the strength of these feelings might vary between individuals, they do tend to mirror some of the major staff objections to integrating technology into their practice. Since most of the schools have access to computers, then the goal becomes one of finding ways to increase levels of participation in computer-mediated learning. To reframe teacher attitudes and increase levels of participation in technology, notions of fear and apathy need to be addressed (Kimber et al., 2002).

The nation must think beyond connecting schools to the Internet and instead think about keeping schools and teachers well informed about the effective use of technology for educational purposes. High-speed connections, complete digital services, and modern computers are basic to every professional workplace and are essential to student learning in the 21st century. But technology will fail to meet its educational promise if we neglect to equip teachers with the skills they need to understand and use it. To touch the future, teachers must understand, be able to use, and be prepared to teach with and about the new technologies. Colleges and universities must provide technology education that enhances the capacities of teachers in proven, observable ways (Adams, 1999).

Pre-Service

The integration of technology into teaching is largely a mental process supported by time, training, and guidance. The dilemma facing colleges of education and schools districts is how to establish the structures and training opportunities that enable teachers to make the mental leap that assumes technology to be a natural and transparent part of their instructional tools. Multiple programs are needed to support and train teachers to use educational technology in their classes. In the researchers' view, the majority of programs should stick to well-developed and safe designs of technology training. In combination, such a portfolio of training fosters future innovation while nurturing the incremental development of present practices (Mergendoller, Johnston, Rockman, & Willis, 1994).

In-Service

Most teachers have not had adequate training to prepare them to use technology effectively in teaching. Currently, most funds for technology are spent on hardware and software, but experienced technology-using sites advocate larger allocations for training and support. On average, districts devote no more than 15% of technology budgets to teacher training. Some states have suggested this figure should be more like 30% (U.S. Congress, Office of Technology Assessment, 1995).

Technology, applied well, can enhance and reinvigorate education, making schools richer and more exciting interactive communities of learning for students and teachers alike. We must do more, however, than put technology in schools: we must empower teachers to use it effectively. Teachers and administrators cannot ensure effective and appropriate use of technology without effective and appropriate training and education (CEO Forum, 1999). New educational goals are required to ensure that students not only conquer the complex knowledge acquisition processes of the digital world but also critique the seductive allure of cyberspace. Teachers need to find ways to harness the changing textuality of digital media and their ways of thinking about technology, so that appropriate pedagogical strategies can be established (Kimber et al., 2002).

Goals

For teachers, it is one thing to work with new technology tools in a workshop setting on an activity that meets their needs as adult learners. It is another thing to bring those tools back into a classroom full of students. And it is another thing yet to exploit the power of these tools to deepen and enrich student learning within specific content areas, in the context of the day-to-day realities of teaching (McNamara & Grant, 1998).

Administrators and teachers have gradually adopted goals for literacy instruction that treat new digital technologies on their own terms rather than simply as extensions of print-based literacy. For example, early on, many schools recognized the need to integrate word processing into instruction in a systematic way, although this awareness was typically linked to creating conventional printed documents. Now, not only are there many more examples of teachers using word processors, there are increasingly more examples of combining word processing with multimedia presentation software such as PowerPoint to engage students in creating multimedia documents for classroom projects, which often include the World Wide Web (Reinking et al., 2000). The primary motivation for teachers to use technology in their classrooms is the belief that the technology will support superior forms of learning. Learning theory and research are extremely important sources of ideas for teachers about instructional goals and strategies (Means, 1994).

Another risk research has pointed to is the lack of congruency when implementing computer applications in the classroom, the embedded curricula, and teaching methods. A study highlighted the complexity of importing curricula and instructional methods embedded in an Integrated Learning System that may compete with normal curricula and practices as one factor influencing the use of computers. Although the lack of harmony between embedded and existing curricula and teaching methods did not appear to concern most teachers in the study, the analysis indicated that these differences hold the potential to affect learning, and sometimes the consequences appeared negative (Miller et al., 2000).

Given the complex relationships among teachers, students, classrooms and information and communication technologies (ICT's), no practice or program is likely to be "pure" or certain in its effects. However, there is a need to help educators to be scrupulous in analyzing the role of technology in pedagogic work, especially with the least advantaged groups of students (Morgan, 2001). In order to better understand the impact of the use of technology in reading achievement, an analysis of teacher technological integration in the classroom is needed. In the case of literacy research and instruction, it is useful both to acknowledge and to consider that there are different levels and types of technological integration that can be achieved (Reinking et al., 2000).

CHAPTER III

METHODOLOGY

Population

The population for this study included 39 schools from Brownsville, Laredo, McAllen, and Pharr-San Juan-Alamo Independent Schools Districts identified as high-performing schools according to the Academic Excellence Indicator System (AEIS). The population was reduced to 29 schools to include only campuses that received a rank of Recognized or above for both the 2002-2003 and 2003-2004 school years. The number of schools was determined by subtracting those campuses that attained the rank of Recognized or above for the two consecutive years. Criterion sampling involves the selection of cases that satisfy an important criterion. This strategy is particularly useful in studying educational programs. A study of the cases that satisfied a certain criteria mostly likely would yield rich information about aspects of the program that work well or poorly (Gall, Borg, & Gall, 2003).

The population of 100 teachers was determined appropriate to meet the requirements for the study results to be generalized as trend data for the public schools in South Texas (Gall et al., 2003) and also to compensate for the number of variables being analyzed in the study. It must be noted that Laredo ISD declined participation in the study, reducing the number of participating schools from 35 to 33 participating schools and the number of participants from 108 to 100. Also, Clearwater Elementary in Brownsville was closed, and there were no data available from them in terms of answers to the teacher survey.

It was determined that teachers in each elementary school were the most qualified to rate the level of technological expertise and integration in third grade classrooms of high-performing schools. Therefore, 100 third grade reading teachers of the selected schools were considered for the selected population and were invited to participate in the research by answering a mailed survey. Differences of access to electronic mail services at the classroom level determined the decision of using regular mail to compile survey data instead of electronic mail.

The return rate for this study was 62 questionnaires or 62% of the original sample. A return rate of 60% or more was set to be able to determine the validity of the study since the sample was rather small. It is important to note the efforts made to secure the survey responses were exhaustive. Initially, the researcher followed the protocol as established in the approved research proposal for this study of first seeking permission and support from the district superintendents and then contacting the sites' principals twice, one by phone and in writing. The researcher then sent a packet to each principal containing a cover letter, instructions for completion of the technology survey, and a set of numbered surveys per site. Numbered surveys were used to monitor survey response and keep teacher confidentiality. A deadline was given to each of the campuses for completion of the survey. The researcher called each site one week prior to the deadline to remind teachers of the coming deadline. Those initial efforts resulted in the return of 35 questionnaires.

As described in the procedures section of this chapter, the researcher made a third attempt to contact all of the schools without responses. This effort yielded an additional 12 responses for a total of 47%. The researcher extended the response deadline and made a fourth effort to contact both non-respondents or sites with only a few responses. This last attempt yielded 15 additional questionnaires for a total of 62 questionnaires or 62%.

The population of 100 third grade reading teachers in high-performing schools represents 33 high-performing schools in three South Texas districts as seen in Table 1: From Brownsville ISD, there were two teachers from Longoria Elementary, three teachers from Martin Elementary, three teachers from Putegnat Elementary, three teachers from Resaca Elementary, three teachers from Sharp Elementary, three teachers from Castaneda Elementary, three teachers from Palm Grove Elementary, five teachers from Egly Elementary, six teachers from Yturria Elementary, four teachers from Aiken Elementary, and five teachers from Hudson Elementary. From McAllen ISD, there were three teachers from Bonham Elementary, four teachers from Milam Elementary, two teachers from Wilson Elementary, four teachers from Rayburn, six teachers from Garza Elementary, and four teachers from Gonzalez Elementary. From Pharr-San Juan-Alamo, there were three teachers from Bowie Elementary, three teachers from Clover Elementary, three teachers from Ford Elementary, three teachers from Daniel Ramirez Elementary, three teachers from Pharr Elementary, four teachers from North San Juan Elementary, three teachers from North Alamo Elementary, and three teachers from Reed N. Mock Elementary.

Table 1. Participating Schools by District and Number of Respondents by School

District Elementary Schools	No. of Participating Elementary Schools in the District	No. of Third Grade Teachers by School Part of Sample
Brownsville	14	
Aliken		4
Castañeda		3
Egly		5
Hudson		5
Longoria		2
Martin		3
Morningside		2
Palm Grove		3
Paredes		3
Putegnat		3
Resaca		3
Sharp		3
Skinner		0
Yturria		6
McAllen	9	
Bonham		3
Escandon		2
Garza		6
Gonzalez		4
Houston		0
Milam		4
Navarro		0
Rayburn		4
Wilson		2
Pharr-San Juan-Alam	10	
Bowie		3
Clover		3
Ford		3
Garza-Pena		2
Long		3
North Alamo		3
North San Juan		4
Pharr		3
Ramirez		3
Reed-Mock		3
Total	33	100

Design of the Study

This exploratory correlational study investigated the relationship between teacher technology skill level and the level of technology integration in third grade reading classes in selected high-performing schools as reported by AEIS in selected districts in South Texas. This study also examined to what extent third grade reading teachers use technology in instruction with third grade students in high-performing elementary schools in selected districts in South Texas. In addition, this study analyzed the factors that support teachers' practice of technology integration for third grade students in high-performing campuses in selected districts in South Texas. Finally, the study endeavored to determine the degree to which teachers integrate state technology application standards in their planning of third grade reading instruction in high-performing campuses in selected districts in South Texas. Gall et al. (2003) state that "educational research develops new knowledge about teaching, learning, and educational administration" (p. 4) and that such research allows for the description of the impact of one phenomena on another. Such was the purpose of this study.

Data concerning the level of integration of technology in third grade reading classes were acquired from selected campuses in selected districts in South Texas in late January and February of 2005 using a modified version of the Integrated Studies of Educational Technology Teacher Survey 2005 from the original Teacher Survey 2001 by SRI International. The study followed seven of the basic steps described by Gall et al. (2003) that require the following to occur: (a) defining the research objectives, (b) selecting a sample, (c) selecting the survey, (d) pre-contacting the sample, (e) writing a cover letter, (f) following up with non-respondents, and (g) analyzing the questionnaire data.

Data on student achievement, campus enrollment, the percentage of students of each ethnicity, the percentage of economically disadvantaged students, the percent of students on the campus classified as Limited English Proficient (LEP), the years of experience in education for teachers on the campus, and the per-pupil expenditures for students on the campus were collected from the Academic Excellence Indicator System (AEIS) report as posted on the Texas Education Agency (2005) Website.

The study design permitted a comparison of the level of technology integration in third grade classrooms and High Performance on the TAAS and TAKS in the selected schools. A 0.05 level of significance was selected for use in this study. As this descriptive study is exploratory in nature, Gall et al. (2003) support the use of this level of significance when they state:

> When interpreting research results, remember that the higher level of significance corresponds to a *lower p* value. For example, $p<.05$ is a lower *p* value than $p<.10$, but a difference that is significant at the .05 *p* level is a more highly significant difference that a difference that is significant at the .10 *p* level. (p. 137) [emphasis in original]

Instrumentation

The selection of the survey instrument began with a search for relevant literature. *The Levels of Technology Implementation (Lo Ti): A Framework for Measuring Classroom Technology Use* (Moersch, 1997) served as the foundational premises for locating the instrument. In addition, a sample from A Pilot Study to Map Technology Availability, Access, and Use at UC Santa Cruz Partnership Schools at

William C. Overfelt High School Teacher Survey served as the catalyst to contact the project director, Lois Bandeira-Locci, from the San Jose extension of the University of California at Santa Cruz. She granted permission to use their instrument and after considering the purposes of the present study, suggested that the researcher review the Integrated Studies of Educational Technology (ISET) Implementing the Technology Literacy Challenge Fund Educational Technology State Grants Program submitted by the American Institutes for Research. This instrument proved to be better suited for the purposes of this study.

The Integrated Studies of Educational Technology Teacher Survey was used as the teacher survey, with some mild modifications (Appendix A). As the ISET survey did not include items regarding the integration of technology standards into the reading lessons and the teachers' skill level integrating technology into their lessons to help students' academic performance in both the TAAS and TAKS, the investigator added these two items into the body of the survey, following the same item construction as the original ISET teacher survey in order to gather data on this area. In addition, items 38, 39, 40, 41, 42, and 44 of the original ISET survey were deemed irrelevant to the study, and consequently deleted from the Integrated Studies of Educational Technology Teacher Survey, Spring 2005 instrument. Table 2 presents information regarding the origin of the survey items used to construct the Integrated Studies of Educational Technology Teacher Survey, Spring 2005, based on the American Institutes for Research (AIR) (2002), *Integrated Studies of Educational Technology (ISET)*

Implementing The Technology Literacy Challenge Fund Educational Technology State Grants Program.

Table 2. Survey Items Origins Plus Additions for the Integrated Studies of Educational Technology Teacher Survey, Spring 2005

Criterion	Survey Item	Description	Origin
A School Description	1	Name of school	ISET Teacher Survey
	2	Professional development/teacher proficiency	ISET Teacher Survey
	3	Students technology access at home	ISET Teacher Survey
	4	Students technology skills	ISET Teacher Survey
	5	Technology provided by school for professional activities	ISET Teacher Survey
	6	Estimate of MAC's and PC's availability at school	ISET Teacher Survey
	7	Technology support available to teachers	ISET Teacher Survey
	8	Is there a "technology coordinator" in your school?	ISET Teacher Survey
	9	Where can you go with questions about using educational technology for instruction?	ISET Teacher Survey
	10	Of the sources above, which one is most helpful?	ISET Teacher Survey
	11	How long does it take to fix a technology problem in your school?	ISET Teacher Survey
B Teacher Technology Proficiency	12	How did you learn to use technology?	ISET Teacher Survey
	13	How often do you use technology doing the professional activities and for how many years have you been doing so?	ISET Teacher Survey
	14	Indicate to what extent, if any, there is Integration of the technology standards in your lessons.	ISET Teacher Survey
	15*	Do you have…a computer at home? Access to the internet at home?	Addition to Survey
	16	To what extent, if any, the listed issues are barriers to your use of educational technology?	ISET Teacher Survey
C Educational Technology Professional Development	17	Indicate all formal technology-related professional development that you participated over the past year	ISET Teacher Survey
	18	Which skills were emphasized in formal professional development this year?	ISET Teacher Survey

Table 2 (continued)

Criterion	Survey Item	Description	Origin
	19	Which topics related to integrating educational technology into instruction were emphasized in formal professional development you participated	ISET Teacher Survey
	20	To what extent, has formal educational technology-related professional development increased these skills?	ISET Teacher Survey
	21	What incentives were available to you for participating in educational technology professional development?	ISET Teacher Survey
	22	What were your reasons for participating in formal technology professional development?	ISET Teacher Survey
	23	Indicate all informal educational technology professional development that you participated over the past year	ISET Teacher Survey
	24	What were some reasons for not participating?	ISET Teacher Survey
	25	Did informal educational technology-related professional development increase in a certain area?	ISET Teacher Survey
	26	What other educational technology-related support do you need?	ISET Teacher Survey
	27	Would you be willing to participate in more professional development in educational technology?	ISET Teacher Survey
	28	What other educational technology-related support do you need?	ISET Teacher Survey
	29	What are your reasons for not being interested in participating in professional development in educational technology at this time?	ISET Teacher Survey
D Teacher Integration of Educational Technology in Teaching	30	How well prepared are you to use computer and the Internet for classroom instruction?	ISET Teacher Survey
	31	Rate your skill level in applications	ISET Teacher Survey
	32*	Indicate your skill level of integrating technology in the classroom to help students achieve the following TEKS	Addition to Survey
	33	How often do students work in the following configuration when using educational technology in your class?	ISET Teacher Survey
	34	How essential is your use of educational technology to your teaching practice?	ISET Teacher Survey

Table 2 (continued)

	Criterion	Survey Item	Description	Origin
		35	Indicate changes that have occurred in your teaching as a result of your use of educational technology	ISET Teacher Survey
E	Personal Demographics	36	Class size	ISET Teacher Survey
		37	Teacher certification	ISET Teacher Survey
		38	Years of experience as a teacher	ISET Teacher Survey
		39	Level of formal educational	ISET Teacher Survey
		40	Gender	ISET Teacher Survey
		41	Year born	ISET Teacher Survey
		42	Ethnicity	ISET Teacher Survey
		43	Race	ISET Teacher Survey
		44	Comments	ISET Teacher Survey

*Denotes added item to the questionnaire.

This survey was comprised of five criterion and 44 indicators. Each of the indicators had from one to up to 22 specifications with a Likert-type scale of choices to document frequency or familiarity to indicate the level of technology integration in the third grade classes. In addition, demographic characteristics items such as class size, certification, years of experience as an educator including highest degree earned, were included in the last criteria of the survey.

Validity of the Instrument

The ISET surveys were developed jointly between the Department of Education (DE) and three contractors. The content areas for each survey were first established, and existing instruments and data sources such as Milken and Market Data Resources were examined for possible use. Although some items from other surveys were adapted for ISET, the vast majority of survey items were new, developed in an iterative, collaborative process between DE staff and the contractors. Because of the nested character of the ISET data collections, surveys were reviewed to ensure that parallel questions were being posed to different respondents, to enhance the ability to triangulate across multiple data sources. All surveys were pilot tested for content and length in July and August 2000. Data collection instruments and procedures were subsequently refined in light of feedback from pilot test respondents. That is, item wording was clarified, response options were modified, and some items were deleted or added (AIR, 2002).

Procedures

Due to the variety of access to electronic mail at the classroom level in the selected districts in South Texas, the survey was distributed via the postal service in order to ensure equal access to the survey for all participants. In addition, this ensured some level of monitoring by the principal distributing the surveys, although it was clearly stated to all participants in their cover letter that participation in this study was strictly voluntary and confidential.

This research study was conducted in late January 2005 through the month of February 2005 with the researcher identifying high-performing campuses in selected districts in South Texas. The demographic information was gathered from the Education Service Center Region One Directory and the Texas Education Agency (2005). The Region One directory included all the districts in South Texas, addresses, phone numbers, grade configurations, names of administrators and their titles, and when provided, the electronic mail addresses of the principals and superintendents within the Region.

After determining the schools for the population, the researcher then sought permission and support from all four superintendents (Appendix B). Each superintendent received an introductory phone call, followed by a letter seeking approval for the study. This occurred during the fall of 2004. Due to circumstances beyond the scope of this study, the superintendent from Laredo ISD declined participation in the study. The other three superintendents granted permission within the month of receiving the letter. Each district followed a different protocol for participation: From Brownsville ISD, that required that an IRB (Investigation Review Board) would be followed, to Pharr-San Juan-Alamo, where the superintendent gave the researcher permission to contact each site principal directly. In McAllen ISD, the office of the superintendent processed the request through the Department of Curriculum and Instruction where the Assistant Superintendent recommended to the superintendent that the study should be allowed to occur in the selected schools. The timeline for the permission process for all participating districts took from August 2004 to November 2004.

After each district granted permission, each site principal was contacted with a phone call in December 2004. The phone call was followed by a letter explaining the study (Appendix C). During the first week of January 2005, another phone call was made to the sites alerting them about the packets containing the teacher surveys, instructions for completing the survey, letters to the teachers, and consent forms (Appendix D). Packets were sent during the second week of January 2005. The researcher called each site after a week from sending the packets to ensure the sites received the packets and notified the sites of the survey deadline. The researcher sent another packet to two sites that had not received the original packet and followed the same protocol for assuring that each site received their packets. During the first week of February 2005, the researcher made another call to each site to remind them about the February 10, 2005 survey deadline. After the deadline, the researcher contacted non-respondent sites or sites with very little responses. Each survey was recorded by number to ascertain subject's anonymity and to monitor survey return patterns. The survey results were then imported into a statistical program (SPSS) by the researcher.

The Academic Excellence Indicator System (AEIS) database posted on the Texas Education Agency (2005) Website was utilized for data collection purposes. The pre-existing data Website was utilized for data collection purposes. The pre-existing data were entered into a spreadsheet created by the researcher so that they could be imported into the statistical analysis program. The data included:

1. The campus identification number.
2. The campus reading TAKS results.
3. Responses to questionnaire items 2, 5, 7, 8, 10, 11, 14, 15, 31, and 32.
4. The data collected above and the data received from the teacher survey were then analyzed using the statistical program entitled SPSS for Windows-Version 11.5, a database for statistical analysis.

Data Analysis

The results of the study were reported using numerical and graphical techniques. Analysis and interpretation of the data followed the principles prescribed in Gall et al. (2003), *Educational Research: An Introduction* (7^{th} ed.). The data collected from the survey were directly imported into a microcomputer version of the Statistical Package for the Social Sciences (SPSS), Version 11.5. The data needed from Texas Education Agency databases were manually entered into a Microsoft Excel spreadsheet and also imported into SPSS for analysis.

Several statistical procedures were performed to answer the research questions to test for correlations and significant differences between the level of implementation of technology as reported by third grade reading teachers on the teacher survey and the selected study variables. The researcher utilized mean scores, standard deviations, frequencies, correlations, and Spearman Rho coefficient, as part of the descriptive and inferential statistical analysis. It was determined that the *Spearman Rho* would be the most appropriate technique because the variables involved in the exploration are expressed as interval scores. The Spearman Rho would be the appropriate correlational statistic for determining the magnitude of the relationship between students' scores on the different measures (Gall et al., 2003). Data analysis has included specific statistical procedures for use in answering each research question.

Research Question #1

The question, "Is there a relationship between levels of technology integration in reading instruction and TAKS reading achievement for third grade students in high-performing campuses as reported by PEIMS in selected districts in South Texas?" was investigated using mean scores, standard deviations, and Spearman Rho correlations. With regard to this question, the independent variable was the level of technology integration in third grade reading classes as determined by the teacher survey results. Additionally, an analysis of variance (ANOVA) was conducted to determine if the extent to which teachers use technology in reading instruction as determined by teacher survey answers had an effect on standardized test scores as reported by AEIS. Tables and matrices were used to illustrate these relationships. The dependent variable was the performance of the students on the campus as determined by the results of the 2002 Texas Assessment of Academic Skills (TAAS) and the 2003 Texas Assessment of Knowledge and Skills (TAKS). Tables were used to illustrate these analyses and relationships.

Research Question #2

The question, "To what extent do teachers use technology in instruction with third grade students in high-performing campuses in selected districts in South Texas?" was investigated using mean scores, standard deviations, and frequencies.

Research Question #3

The question, "What factors support teachers' practice of technology integration for third grade students in high-performing campuses in selected districts in South Texas?" was investigated using mean scores and standard deviations. With regard to this question, the independent variable was the factors that support teachers' practice of technology integration as determined by the answers in the teacher survey.

The dependent variable was the performance of the students on the campus as determined by the results of both the Texas Academic Assessment Skills (TAAS) and the Texas Assessment of Knowledge and Skills (TAKS). Tables were used to illustrate these analyses and relationships.

Research Question #4

The question, “To what degree do teachers integrate state technology application standards in their planning of third grade reading instruction in high-performing campuses in selected districts in South Texas?” was investigated using mean scores, standard deviations, and frequencies. In these analyses, the dependent variable was the students’ performance in both the Texas Academic Assessment Skills (TAAS) and the Texas Assessment of Knowledge and Skills (TAKS). The independent variable was the level of teacher integration of the state technology application standards in their planning of third grade reading instruction as determined by the responses to the teacher survey. Tables and matrices were used to illustrate these data. The findings yielded from these descriptive, correlational, and inferential procedures are presented and discussed in Chapter IV.

CHAPTER IV

ANALYSIS OF THE DATA

This chapter presents and analyzes the data collected for this study. The first goal of this research was to determine if there is a relationship between the levels of technology integration in reading instruction and levels of teacher technology skill level for third grade classrooms in high-performing campuses as reported by AEIS in selected elementary schools in South Texas. Second, the study sought to determine the extent to which technology is used in reading instruction with third grade students in high-performing campuses in selected elementary schools in South Texas. In addition, the study identified the factors that support the integration of technology for third grade students in high-performing campuses in selected elementary schools in South Texas. Finally, the study examined to what degree the level of the integration of state technology application standards is applied in the planning of third grade reading instruction and student performance in TAKS.

Research Question #1

Is there a relationship between levels of technology integration in reading instruction and the levels of teacher technology skills levels for third grade classrooms in high-performing campuses as reported by AEIS in selected elementary schools in South Texas?

The first level of analysis to answer Research Question #1 was to test the strength of the relationship between teacher technology skill level and the level of technology integration in the classroom. This analysis was done at the individual teacher level. Table 3 presents the data for this level of analysis.

Table 3. Spearman Rho Correlation Between Teacher Skill Level and Level of Technology Integration in the Classroom for All Third Grade Teachers Participating in the Study (Items 31 and 32)

	Independent Variable	Dependent Variable
	Spearman's Rho	Level of Integration
Teacher Skill Level	Correlation Coefficient	0.50**
	Sig. (2-tailed)	0.01

**Correlation is significant at the 0.01 level (2-tailed).

There is a positive relationship between the teacher skill level and the level of technology integration in the classroom across all 60 respondents. The Spearman Rho correlation coefficient was 0.50, which was significant at the 0.01 level. When calculating r^2 for this coefficient, 0.25, 75% of the variance in technology integration in reading was unaccounted for by teacher skill level for all participants.

A Spearman Rho test was also run across districts. Table 4 presents the data that measures the strength of the relationship between teacher skill level and level of technology integration in the classroom by districts.

Across districts, some levels of variance appear. Specifically, data for Brownsville present a correlation coefficient of 0.65. Therefore, 42% (r^2) of the variance of technology integration in the classroom is accounted for by teacher skill level. This means that 58% of the variance is unaccounted. For McAllen, the Spearman Rho was 0.37. Consequently, only 13% (r^2) of the variance of technology integration in the classroom is accounted for by teacher skill level. However, 87% of the variance cannot be predicted from teacher skill level. Finally, the same pattern applies to PSJA, with a greater degree of variance with a Spearman Rho of 0.10. In PSJA, only 1% of the variance of technology integration in the classroom is accounted for by teacher skill level. This means that 99% of the variance cannot be predicted from teacher skill level.

Table 4. Spearman Rho Correlation Between Teacher Skill Level and Level of Technology Integration in the Classroom for Brownsville ISD, McAllen ISD, and PSJA ISD (Items 31 and 32)

				Dependent Variable	
District	Correlation	Independent Variable		Item 31	Item 32
Brownsville**	Spearman's rho	Item 31	Correlation Coefficient		0.65
			Sig. (2-tailed)		0.01
McAllen	Spearman's rho	Item 31	Correlation Coefficient		0.37
			Sig. (2-tailed)		0.23
Pharr-San Juan-Alamo	Spearman's rho	Item 31	Correlation Coefficient		0.10
			Sig. (2-tailed)		0.75

**Correlation is significant at the 0.01 level (2-tailed).

Thus, it was found for this sample, that technology skill level is a fairly weak predictor of level of integration of technology in the classroom. Since the relationship was uneven across districts, a test for differences (ANOVA) was performed across districts and by campuses.

Data gathered on items 31 and 32 of the teacher survey were used to explore the differences between the teacher technological skill level and the levels of technology integration in their reading classes. Table 5 represents the level of variance, the mean, and standard deviation as they describe the differences across districts in the level of technology integration in reading instruction in third grade classes.

Table 5. Analysis of Variance (ANOVA) of Teacher Skills Levels and Level of Technology Integration in the Classroom Across Brownsville ISD, McAllen ISD, and Pharr-San Juan-Alamo ISD (Items 31 and 32)

Teacher Skill Level ANOVA by District	Brownsville	McAllen	Pharr-San Juan-Alamo	Sum of Squares	df	Mean Square	F	Sig.
Between Groups				0.19	2	0.09	0.31	0.74
Within Groups				4.78	16	0.30		
Total	12	4	4	4.97	18			
Level of Technology Integration in the Classroom ANOVA by District								
Between Groups				0.33	2	0.17	0.48	0.63
Within Groups				5.58	16	0.35		
Total	12	4	4	5.91	18			

Item 31, teacher skill level, was a composite of 13 possible technological skills, and teachers rated themselves in a four level Likert-like scale ranging from “not familiar, don’t use” to “transformation.” Each level on the scale was given numerical values from “0” to “3.” Teachers rated themselves according to these intervals. Based on this scale, the data show that across districts there is not significant difference ($p=0.738$ and > 0.05) in teachers’ technological skill level. In addition, the skill range was identified from 0.39 to 2.44, with a mean of 1.26, and a standard deviation of 0.53. Thus, the three districts were relatively homogeneous on the measure of teacher skill level.

The next item for analysis was item 32, level of technology integration, in the 2005 Teacher Survey. This item was related to the level of technology integration specifically in reading classrooms in third grade. The item was made of a composite of eight possible technology activities in the classroom, including using technology to increase vocabulary development, analyze the characteristics of various types of text, etc. Table 6 represents the level of variance, the mean, and standard deviation as they describe the differences across districts in the level of technology integration in reading classes in third grade.

Table 6. Descriptive Statistics by District of Teacher Technology Skill Level and Level of Technology Integration Including Mean and Standard Deviation Across Brownsville ISD, McAllen ISD, and Pharr-San Juan-Alamo ISD

Descriptive Statistics by District	Brownsville	McAllen	Pharr-San Juan-Alamo	Mean	Std. Deviation
Teacher Skill Level	12	4	4	1.26	0.53
Level of Technology Integration in reading instruction	12	4	4	1.44	0.57

As with item 31, item 32 was a composite of eight technology activities in the classroom, and teachers rated themselves in a four-level Likert-like scale ranging from not familiar, don’t use to transformation. Each level on the scale was given numerical values from “0” to “3.” Teachers rated themselves along these intervals. Based on this scale, the data show that the level of technology integration across districts is rather similar ($p=0.63 > 0.05$), there is no significant difference across districts. The integration level ranged from 0.12 to 2.5 with a mean of 1.4 and standard deviation of

0.57. Again, the three districts were relatively homogeneous on the measure of the level of technology integration in reading instruction.

Items 31 and 32 were also analyzed across individual schools. Table 7 presents the analysis of variance for both teacher skill level (item 31), and level of technology integration in the reading classroom (item 32) by schools. The data show that there is a significant difference in skill level (p=0.001 < 0.05), item 31, and in the level of technology integration (p=0.04< 0.05), item 32, when the analysis is conducted by schools.

Table 7. Analysis of Variance (ANOVA) of Teacher Skill Level and Level of Technology Integration by School Across Brownsville ISD, McAllen ISD, and Pharr-San Juan-Alamo ISD (Items 31 and 32)

Teacher Skill Level ANOVA by School	Brownsville	McAllen	Pharr-San Juan-Alamo	Sum of Squares	df	Mean Square	F	Sig.
Between Groups				15.36	19.00	0.81	3.30	0.001
Within Groups				10.30	42.00	0.25		
Total	35	14	13	25.65	61.00			
Level of Technology Integration in the Classroom ANOVA by District								
Between Groups				14.31	19.00	0.75	1.90	0.04
Within Groups				15.85	40.00	0.40		
Total	35	13	12	30.16	59.00			

In addition, Table 8 presents mean and standard deviation for teacher skill level (item 31) and level of technology integration (item 32) by school. The data demonstrated that in teacher skill level by campus the range goes from 0.0 to 2.7, with a mean of 1.29, and standard deviation of 0.65. For item 32, level of technology integration, the data demonstrated a range from 0.0 to 3.0, with a mean of 1.47, and standard deviation of 0.72.

Table 8. Mean Data, and Standard Deviations for Teacher Skill Level and Levels of Technology Integration by School Across Brownsville ISD, McAllen ISD, and Pharr-San Juan-Alamo ISD (Items 31 and 32)

Descriptive Statistics by School	Brownsville	McAllen	Pharr-San Juan-Alamo	Mean	Standard Deviation
Teacher Skill Level	35	14	13	1.29	0.65
Level of Technology Integration in reading instruction	35	13	12	1.47	0.72

When the analysis of teachers' responses is compared across the districts, there are no significant differences. However, when the comparisons are made by campuses, significant differences are found. Yet, when a post hoc Tukey test was attempted to identify the significant differences through pair-wise comparisons, SPSS was not able to process the test due to the wide variety of the number of teacher responses by campus; some campuses had only one response while other campuses had two, three, or more. This applied for both items 31 and 32. Consequently, precisely which schools differed cannot be statistically determined at this point.

So, although the specific school or schools that differed from the sample cannot be pinpointed for this sample, it is useful to broadly describe variations across the 20 campuses in the sub-items for teacher skill level (Item 31) and for level of technology integration in reading instruction (Item 32).

In addition to the variance data, percentages were calculated to illustrate some of the specific teacher skill levels teachers reported. Table 9 presents the percentages of responses about teacher skills levels.

Table 9. Skill Level Percentages of Third Grade Teachers in Brownsville, McAllen, and PSJA (Item 31)

Skill	Not familiar with/don't use	Entry	Adaptation	Trans.	No Response
Brownsville (N=33)					
a. Computers in general	2.7	16.2	64.9	13.5	2.7
b. Word processing programs	5.4	13.5	62.2	18.9	0.0%
c. Spreadsheet programs	21.6	21.6	40.5	13.5	2.8%
d. Database programs	27.0	32.4	32.4	8.1	0.1%
e. Drawing, painting, or image editing programs	29.7	27.0	40.5	2.7	0.1
f. Desktop publishing or presentation programs (e.g., PowerPoint)	32.4	16.2	45.9	5.4	0.1
g. Multimedia programs (e.g., HyperStudio)	45.9	35.1	16.2	2.7	0.1
h. Reference information on CD-ROM	35.1	19.7	29.7	5.4	10.1
i. Internet browsers (e.g., Netscape)	13.5	5.4	59.5	21.6	0.0
j. E-mail programs	8.1	13.5	62.2	16.2	0.0
k. Web page creation programs (e.g., FrontPage)	48.6	35.1	8.1	2.7	5.5
l. Integrated learning systems (e.g., Jostens, CCC)	45.9	29.7	8.1	8.1	8.2
m. Skills Practice/Tutorial programs	27.0	18.9	37.8	10.8	5.5
McAllen (N=16)					
a. Computers in general	0.0	33.3	41.7	25.0	0.0
b. Word processing programs	0.0	41.7	50.0	8.3	0.0
c. Spreadsheet programs	50.0	41.7	8.3	0.0	0.0
d. Database programs	50.0	41.7	8.3	0.0	0.0
e. Drawing, painting, or image editing programs	41.7	41.7	16.6	0.0	0.0
f. Desktop publishing or presentation programs (e.g., PowerPoint)	50.0	41.7	8.3	0.0	0.0
g. Multimedia programs (e.g., HyperStudio)	75.0	16.7	8.3	0.0	0.0
h. Reference information on CD-ROM	50.0	25.0	25.0	0.0	0.0
i. Internet browsers (e.g., Netscape)	8.3	25.0	58.3	8.3	0.1
j. E-mail programs	0.0	25.0	58.3	16.7	0.0

Table 9 (continued)

Skill	Not familiar with/don't use	Entry	Adaptation	Trans.	No Response
k. Web page creation programs (e.g., FrontPage)	58.3	33.3	8.3	0.0	0.1
l. Integrated learning systems (e.g., Jostens, CCC)	33.3	25.0	41.7	0.0	0.0
m. Skills Practice/Tutorial programs	33.3	25.0	41.7	0.0	0.0
Pharr-San Juan-Alamo (N=13)					
a. Computers in general	0.0	38.5	38.5	23.0	0.0
b. Word processing programs	0.0	38.5	38.5	23.0	0.0
c. Spreadsheet programs	0.0	53.8	38.5	7.7	0.0
d. Database programs	23.1	30.8	38.5	7.6	0.0
e. Drawing, painting, or image editing programs	0.0	76.9	23.1	0.0	0.0
f. Desktop publishing or presentation programs (e.g., PowerPoint)	7.7	46.2	38.5	7.6	0.0
g. Multimedia programs (e.g., HyperStudio)	38.5	30.8	23.1	0.0	7.6
h. Reference information on CD-ROM	23.1	46.2	23.1	7.6	0.0
i. Internet browsers (e.g., Netscape)	7.7	30.8	46.2	15.3	0.0
j. E-mail programs	0.0	38.5	46.2	15.3	0.0
k. Web page creation programs (e.g., FrontPage)	46.2	38.5	7.7	0.0	7.6
l. Integrated learning systems (e.g., Jostens, CCC)	30.8	15.4	30.8	23.0	0.0
m. Skills Practice/Tutorial programs	15.4	46.2	23.1	7.7	7.6

An analysis of the percentages of responses to the teacher skill level, item 31, demonstrates a couple of patterns across the districts. The highest percentages tended to be at the adaptation level or below. In Brownsville, responses were given to the 13 variables that compose this item at the transformation level; however, those percentages were lower than those at the adaptation level and below. In McAllen, teachers also reported to be at the adaptation level in about half of the variables presented; yet, they responded to be not familiar with more than half of the variables. In PSJA, the responses were evenly distributed in both the adaptation level and the entry level for about half of the variables. The main pattern per variable was that of teachers ranking themselves at the adaptation level in variable a "computers in general."

A similar analysis was made for item 32, level of technology integration in the classroom. Table 10 demonstrates the percentages of levels of technology integration in all three districts.

Table 10. Levels of Technology Integration Percentages of Third Grade Teachers in Brownsville ISD, McAllen ISD, and PSJA ISD (Item 32)

District	Do Not Use	Entry	Adaptation	Transformation	No Response
Brownsville (N=33)					
a. Students are able to use technology to increase strategies for word documentation.	28.6	45.7	20.0	5.7	0.0
b. Students use technology to read a variety of texts.	2.9	25.7	60.0	11.4	0.0
c. Students use technology to develop vocabulary.	11.4	22.9	60.0	5.7	0.0
d. Students use technology to better reading comprehension.	2.9	17.1	68.6	11.4	0.0
e. Students use technology to analyze the characteristics of various types of texts; including character analysis, the importance of setting, and the development of the plot.	11.4	11.4	65.7	11.4	0.1
f. Students use technology to represent text information in different ways; including story maps, graphs, and charts.	22.9	8.6	68.5	0.0	0.0
g. Students use technology to read and comprehend a variety of text genres; including lists, newsletter, signs, etc.	8.6	25.7	51.4	14.3	0.0
h. Students use technology to demonstrate their understanding of text applying critical-thinking skills; including making inferences, predictions, distinguishing between fact and opinion, etc.	14.3	14.3	54.3	17.1	0.0

Table 10 (continued)

District	Do Not Use	Entry	Adaptation	Transformation	No Response
McAllen (N=16)					
a. Students are able to use technology to increase strategies for word documentation.	28.6	50.0	14.3	0.0	7.1
b. Students use technology to read a variety of texts.	14.3	57.1	14.3	7.1	7.2
c. Students use technology to develop vocabulary.	21.4	57.1	14.3	0.0	7.2
d. Students use technology to better reading comprehension.	14.3	57.1	7.1	14.3	7.2
e. Students use technology to analyze the characteristics of various types of texts; including character analysis, the importance of setting, and the development of the plot.	14.3	50.0	28.6	0.0	7.1
f. Students use technology to represent text information in different ways; including story maps, graphs, and charts.	28.6	42.9	21.4	0.0	7.1
g. Students use technology to read & comprehend a variety of text genres; including lists, newsletter, signs, etc.	28.6	42.9	14.3	7.1	7.1
h. Students use technology to demonstrate their understanding of text applying critical-thinking skills; including making inferences, predictions, distinguishing between fact and opinion, etc.	21.4	50.0	14.3	7.1	7.2
Pharr-San Juan-Alamo (N=13)					
a. Students are able to use technology to increase strategies for word documentation.	7.7	38.5	15.4	15.4	23.0
b. Students use technology to read a variety of texts.	15.4	15.4	38.5	23.1	7.6
c. Students use technology to develop vocabulary.	7.7	15.4	46.2	23.1	7.6
d. Students use technology to better reading comprehension.	0.0	23.1	53.8	15.4	7.7
e. Students use technology to analyze the characteristics of various types of texts; including character analysis, the importance of setting, and the development of the plot.	15.4	46.2	15.4	15.4	7.6
f. Students use technology to represent text information in different ways; including story maps, graphs, and charts.	46.2	7.7	23.1	15.4	7.6

Table 10 (continued)

District	Do Not Use	Entry	Adaptation	Transformation	No Response
g. Students use technology to read & comprehend a variety of text genres; including lists, newsletter, signs, etc.	23.1	30.8	30.8	7.7	7.6
h. Students use technology to demonstrate their understanding of text applying critical-thinking skills; including making inferences, predictions, distinguishing between fact and opinion, etc.	23.1	30.8	23.1	15.4	7.6

The data reflect that, just like item 31, teachers' high percentages levels were in the adaptation or less levels. Teachers in Brownsville reported to be at the adaptation level in seven out of the eight variables. In McAllen, the high percentages were reported at the entry level in all eight variables for this item. Data for PSJA do not reveal any specific pattern; high percentages are in adaptation, entry, and do not use levels.

The analysis reveals that a significant level of difference exists among campuses, but not districts. This supports the reasoning that there are ways in which high-performing campuses (in reading) are not really homogeneous. The factors that may help explain some of the differences between teacher skill level and the level of technology integration in the classroom are analyzed in Research Question #2.

Research Question #2

To what extent is technology used in instruction with third grade students in high-performing campuses in selected elementary schools in South Texas?

Descriptive data from question item 14 in the 2005 Teacher Survey served as the source for the data regarding the extent to which teachers used technology in their instruction. The extent of the use of technology by teachers is framed in this study into 12 different professional activities, including the creation of instructional materials, gathering information electronically for planning lessons, electronic access of model lesson plans, etc.

For this analysis the 12 activities were grouped into three categories: First, items a through e are activities that involve lesson planning, design, and instruction enhancement. Second, item f refers to administrative record keeping. Third, items g through k incorporate different ways of electronic communication, from direct one-on-one communication to Web posting of classroom information.

Data analysis for each district will be presented in a number of tables. Table 11 presents the data on the percentage of time that teachers use technology in their instruction in Brownsville, ISD.

Table 11. Percentage of Time That Teachers Use Technology for Professional Activities in Brownsville, ISD, McAllen, and Pharr-San Juan-Alamo (Item 14)

District	Skill	Do not use technology for this activity	Less than once a month	A few times a month	A few times a week	Daily	No Response
	Brownsville (N=33)						
Lesson Design and Instruction Enhancement	a. To create instructional materials (i.e., handouts, tests, etc.)	2.7	10.8	27.0	29.7	19.7	10.1
	b. To gather information for planning lessons	8.1	27.0	24.3	13.5	24.3	2.8
	c. To access model lesson plans	16.2	24.3	29.7	16.2	8.1	5.5
	d. To access information and research on best practices for teaching	18.9	21.6	18.9	13.5	2.2	24.9

Table 11 (continued)

District	Skill	Do not use technology for this activity	Less than once a month	A few times a month	A few times a week	Daily	No Response
	e. To create multimedia presentations for the classroom	45.9	13.5	16.2	13.5	0.0	10.9
Administrative Record Keeping	f. To do administrative record keeping, (i.e., grades, attendance, etc.)	8.1	0.0	13.5	16.2	59.5	2.7
Communications	g. To communicate with colleagues and/or other professionals	5.4	8.1	24.3	27.0	32.4	2.8
	h. To communicate with students' parents	56.8	13.5	13.5	2.7	8.1	5.4
	i. To communicate with students outside of classroom hours	78.4	5.4	10.8	0.0	2.7	2.7
	j. To post homework or other class requirements, project information or suggestions	70.2	5.4	10.8	0.0	10.8	2.8
	k. To post/share student work on the Web	83.8	5.4	5.4	0.0	2.7	2.7
McAllen (N=16)							
Lesson Design and Instruction Enhancement	a. To create instructional materials (i.e., handouts, tests, etc.)	8.3	16.7	33.3	33.3	8.3	0.1
	b. To gather information for planning lessons	33.3	8.3	25.0	33.3	0.0	0.1
	c. To access model lesson plans	41.7	16.7	25.0	16.7	0.0	0.0
	d. To access information and research on best practices for teaching	41.7	33.3	16.7	8.3	0.0	0.0
	e. To create multimedia presentations for the classroom	75.0	8.3	8.3	0.0	0.0	8.4
Administrative Record Keeping	f. To do administrative record keeping, (i.e., grades, attendance, etc.)	0.0	0.0	8.3	8.3	83.3	0.1
Communications	g. To communicate with colleagues and/or other professionals	0.0	0.0	25.0	58.3	16.7	0.0
	h. To communicate with students' parents	41.7	8.3	50.0	0.0	0.0	0.0
	i. To communicate with students outside of classroom hours	75.0	16.7	0.0	0.0	0.0	8.3
	j. To post homework or other class requirements, project information or suggestions	25.0	50.0	25.0	0.0	0.0	0.0
	k. To post/share student work on the Web	75.0	16.7	0.0	0.0	0.0	8.3
Pharr-San Juan-Alamo (N=13)							
Lesson Design and Instruction Enhancement	a. To create instructional materials (i.e., handouts, tests, etc.)	7.7	15.4	15.4	46.2	7.7	7.6
	b. To gather information for planning lessons	7.7	7.7	38.5	38.5	0.0	7.6
	c. To access model lesson plans	7.7	15.4	30.8	30.8	0.0	15.3

Table 11 (continued)

District	Skill	Do not use technology for this activity	Less than once a month	A few times a month	A few times a week	Daily	No Response
	d. To access information and research on best practices for teaching	7.7	23.1	46.2	15.4	0.0	7.6
	e. To create multimedia presentations for the classroom	53.8	7.7	7.7	15.4	0.0	15.4
Administrative Record Keeping	f. To do administrative record keeping, (i.e., grades, attendance, etc.)	23.1	0.0	23.1	15.4	30.8	7.6
Communications	g. To communicate with colleagues and/or other professionals	15.4	15.4	7.7	15.4	30.8	15.3
	h. To communicate with students' parents	69.2	7.7	7.7	7.7	0.0	7.7
	i. To communicate with students outside of classroom hours	76.9	7.7	0.0	0.0	0.0	15.4
	j. To post homework or other class requirements, project information or suggestions	61.5	7.7	15.4	0.0	0.0	15.4
	k. To post/share student work on the Web	76.9	7.7	0.0	0.0	0.0	15.4

In the first five items, a through e, the lowest percentage was recorded in the e category, "use of multimedia presentations on a daily basis." In addition, this category had the highest percentage score, 45.9%, in the do not use level. The highest daily use in this category was reported for item b, "to gather information for planning lessons." In Brownsville, the highest percentages of daily use of technology by teachers in this category were 24.3% for b, "gather information for planning lessons" and 19.7% for a, "creating instructional materials."

The second category had the highest average daily use, 59.5%, for any one professional activity using technology. This was letter f, "to do administrative record keeping." Only 8.1% of the responses reported do not use for this activity.

In the last category of this question, items g through k, electronic communication, the highest daily use percentage, 32.4%, was reported for item g, “communicating with colleagues and other professionals.” The percentage for “communicating with parents electronically” on a daily basis was 8.1%, and most of the respondents claimed not to use this venue at all, 56.8% of the responses; 10.8% of the respondents claimed to post homework or other assignments on the Web, although 70.2% of them said they never use technology for this activity.

Brownsville ISD teachers reported to be using technology for an individual professional use, such as communicating with colleagues, for gathering lesson plans information, and record keeping. However, they do not appear to use as much technology to interact with students and parents as much as they use it with other professionals.

In the first five items, a through e, the highest daily use percentage, 8.3%, was item a, “creating instructional materials.” All other items in this category had a 0.0% in daily use. The next highest percentage for a more habitual use of technology in this category was 33.3%, in the a few times a week for items a, “creating instructional materials,” and b, “gathering information for lesson plans.”

The second category had the highest average daily use, 83.3%, for any one professional activity using technology. This was letter f, “to do administrative record keeping.”

In the last category of this question, items g through k, electronic communication, the only average daily use, 16.7%, was recorded for item g, “communicating with colleagues and/or other professionals.” All other items had a 0% daily use. The next highest use was 58.3%, which describes using technology to communicate with colleagues and/or other professionals a few times a week. This was followed by 50% of teachers who claimed that they post homework or other class requirements on the Web less than once a month. The percentage for communicating with parents electronically was 50% a few times a month; 75% of the responses determined that teachers do not use technology to “communicate with students outside of the classroom,” item i, and “to post/share student work on the Web,” item k.

In McAllen, ISD teachers reported using technology for “administrative record keeping” and “communicating with colleagues and other professionals.” However, their responses are not as frequent for using technology for other purposes such as lesson planning, or enhancing instruction, or to communicate with parents and students. They responded with more frequency to the lowest ranks of the scale in a number of items, except for “administrative record keeping.”

Data from PSJA demonstrated in the first five items, a through e, the highest daily use percentage, 7.7%, were reported in item a, creating instructional materials. All the other items in this category had 0.0% in daily use; these included all the activities involving lesson planning and design. In PSJA, the majority of responses in this first category were in the a few times a month level. The highest percent, 53.8%, was item e, using multimedia for classroom presentations, with a do not use technology for this activity level. The second, 46.2%, and third, 38.5%, highest response rates were reported for d, “accessing model lesson plans,” and b, “gathering information for planning lessons” at the a few times a month level.

The second category had one of the highest percentages in daily use, 30.8% , for any one professional activity using technology. This was letter f, “to do administrative record keeping.”

In the last category of this question, items g through k, “electronic communication,” in this category, the only average daily use, 30.8%, was recorded for item g, “communicating with colleagues and/or other professionals.” All other items had a 0% daily use. The next highest use percentage was 15.4%, which describes using technology to communicate with colleagues and/or other professionals a few times a week. This was followed by 15.4% of teachers who claimed that they post homework or other class requirements on the Web a few times a month. The highest percentage for communicating with parents electronically was 7.7% a few times a week. The highest percentages of these responses determined that teachers do not use technology “to communicate with students outside of the classroom,” item i, and “to post/share student work on the Web,” item k.

According to these data, the highest percentage of daily use of technology across the districts was item f, “to do administrative record keeping.” In daily use, a look across the categories reveals little difference between districts. The percentages are the lowest when compared to other less use of technology levels. In addition, the percentages reveal a more individual pattern in the use of technology for professional purposes. Teachers report using the computer more often for “administrative record keeping," item f, and "for communicating with other colleagues and/or professionals," item g.

Research Question #3

What factors support the practice of technology integration for third grade students as reported by teachers in high-performing campuses in selected elementary schools in South Texas?

Items 2, 5, 7, 8, 10, and 11 from the 2005 Teacher Survey were identified to be able to identify the factors that support the practice of technology integration in third grade reading classrooms. These items were grouped into six categories: Needs Assessment (Item 2), Hardware Available in Classroom (Item 5), Technical Support (Item 7), Presence of Campus Technology Coordinator (Item 8), Most Useful Resource for Technology Integration in Classroom (Item 10), and Response Time for Technical Support (Item 11).

Data for this question presented a number of patterns. Table 12 exhibits percentages of teacher's responses to school/district inquiring about technology professional development needs.

Table 12. Percentage of Teachers' Responses to School/District Inquiring About Technology Professional Development Needs in Brownsville ISD, McAllen, and Pharr-San Juan-Alamo (Item 2)

Skill	Yes	No	Don't Know	No Response
Brownsville (N=33)				
a. …find out what teachers' needs for educational technology-related professional development are?	91.9	0.0	8.1	0.0
b. …assess the effectiveness of the technology-related professional development offered by your school or district?	64.9	10.8	24.3	0.0
c. …assess teacher proficiency in the use of technology as an educational resource?	64.9	10.8	24.3	0.0
McAllen (N=16)				
a. …find out what teachers' needs for educational technology-related professional development are?	75.0	8.3	16.7	0.0
b. …assess the effectiveness of the technology-related professional development offered by your school or district?	50.0	8.3	41.7	0.0
c. …assess teacher proficiency in the use of technology as an educational resource?	41.7	16.7	41.6	0.0
Pharr-San Juan-Alamo (N=13)				
a. …find out what teachers' needs for educational technology-related professional development are?	61.5	7.7	23.1	7.7
b. …assess the effectiveness of the technology-related professional development offered by your school or district?	15.4	23.1	46.2	15.3
c. …assess teacher proficiency in the use of technology as an educational resource?	30.8	30.8	30.8	7.6

In Brownsville, 91.9% of the responses show that teachers are aware of their school/district conducting needs assessment efforts in the area of technology-related professional development. In addition, more than half, 64.9%, of the responses claim the efforts the school/district are making to assess "technology-related professional development" and "teacher proficiency in the use of technology as an educational resource."

Data from McAllen ISD also presented high percentages in the three different components for needs assessment in the awareness level. Although 75% of the responses show that teachers are aware of their school/district conducting needs assessment efforts in the area of technology-related professional development, there is a split in the other two categories. Half of the responses, 50.0%, are aware of the effort to assess the effectiveness of technology-related professional development; another 41.7% claim don't know about these efforts. This pattern is repeated for the third component, teacher proficiency in the use of technology as an educational resource, with 16.7% claiming that there are no efforts to assess teacher proficiency in the use of technology.

The data from Pharr-San Juan-Alamo ISD presented more differences in the percentages of the three different components for needs assessment in all the awareness levels. In PSJA, teachers are fairly aware, 61.5%, of their school/district conducting needs assessment efforts in the area of technology-related professional development. Percentages in the other two components do not show a clear pattern about the level of assessment of the effectiveness of technology-related professional development offered by the district, or those who claim that there are no efforts to assess teacher proficiency in the use of technology, 69.3% for the first, and 30.8% in each level for the second item.

Item 5 refers to the access teachers have to computer connectivity, sub-items a and b, computer peripherals and software, c through n, and other technology o through s. Table 13 presents the percentages of teachers responses to the availability of connectivity, software, peripherals, and other technology in both the school and their classroom in Brownsville ISD. For the purposes of this study, only components "available in their classroom for their own use" will be considered in all three districts.

Table 13. Percentages of Teachers' Responses to the Availability of Connectivity, Software, Peripherals, and Other Technology in the School and Their Classroom in Brownsville ISD, McAllen ISD, and PSJA ISD (Item 5)

Skill	Available in your school, all teachers may use	Both	Available in your classroom primarily for your own use	No Response
	Brownsville (N=33)			
a. Access to the schools' local computer network from home	32.4	24.3	28.9	14.4
b. Access to the Internet from home, through a district Internet connection.	29.7	37.8	16.2	16.3
c. Software you can borrow to learn to use at home	21.6	16.2	18.9	43.3
d. Printers	21.6	37.8	32.4	8.2
e. CD-ROM drive	27.0	35.1	27.0	10.9
f. Probes for collecting scientific data (e.g., temperature)	24.3	13.5	13.5	48.7
g. DVD drive	32.4	13.5	16.2	37.9
h. Jazz, Zip, or similar drive	10.8	10.8	13.5	64.9
i. Microphones to use with computers	21.6	8.1	16.2	54.1
j. External computer speakers	16.2	27.0	43.2	13.6
k. Digital still camera	32.4	18.9	13.5	35.2
l. Digital video camera	24.3	13.5	0.0	62.2
m. A device to project computer screen for class viewing	45.9	13.5	8.1	32.5
n. Scanner	27.0	0.0	2.7	70.3
o. Telephone	70.3	2.7	0.0	27.0
p. Voice-mail account	8.1	5.4	0.0	86.5
q. E-mail account	48.6	35.1	10.8	5.5
r. TV and VCR	54.1	32.4	13.5	0.0
s. Easy access to a fax machine	64.9	2.7	8.1	24.3
	McAllen (N=16)			
a. Access to the schools' local computer network from home	33.3	25.0	16.7	2.5
b. Access to the Internet from home, through a district Internet connection.	58.3	16.7	8.3	16.7
c. Software you can borrow to learn to use at home	33.3	0.0	0.0	66.7

Table 13 (continued)

Skill	Available in your school, all teachers may use	Both	Available in your classroom primarily for your own use	No Response
d. Printers	50.0	25.0	16.7	8.3
e. CD-ROM drive	41.7	33.3	16.7	8.3
f. Probes for collecting scientific data	8.3	0.0	0.0	91.7
g. DVD drive	16.7	25.0	0.0	58.3
h. Jazz, Zip, or similar drive	33.3	8.3	16.7	41.7
i. Microphones to use with computers	0.0	0.0	0.0	100.0
j. External computer speakers	41.7	0.0	0.0	58.3
k. Digital still camera	58.3	0.0	8.3	33.4
l. Digital video camera	41.7	0.0	0.0	58.3
m. A device to project computer screen for class viewing	66.7	0.0	16.7	16.6
n. Scanner	50.0	0.0	0.0	50.0
o. Telephone	66.7	8.3	0.0	25.0
p. Voice-mail account	0.0	0.0	0.0	100.0
q. E-mail account	33.3	33.3	16.7	16.7
r. TV and VCR	50.0	8.3	33.3	8.4
s. Easy access to a fax machine	58.3	0.0	0.0	41.7
Pharr-San Juan-Alamo (N=13)				
a. Access to the schools' local computer network from home	61.5	15.4	7.7	15.4
b. Access to the Internet from home, through a district Internet connection.	69.2	7.7	0.0	23.1
c. Software you can borrow to learn to use at home	0.0	0.0	38.5	61.5
d. Printers	23.1	15.4	61.5	0.0
e. CD-ROM drive	7.7	15.4	69.2	7.7
f. Probes for collecting scientific data	0.0	0.0	30.8	69.2
g. DVD drive	15.4	7.7	38.5	38.4
h. Jazz, Zip, or similar drive	0.0	7.7	15.4	76.9
i. Microphones to use with computers	15.4	0.0	23.1	61.5
j. External computer speakers	7.7	23.1	38.5	30.7
k. Digital still camera	61.5	0.0	7.7	30.8
l. Digital video camera	38.5	0.0	7.7	53.8
m. A device to project computer screen for class viewing	46.2	7.7	7.7	38.4
n. Scanner	38.5	0.0	15.4	46.1
o. Telephone	69.2	0.0	0.0	30.8
p. Voice-mail account	0.0	0.0	0.0	100.0
q. E-mail account	38.5	38.5	23.0	0.0
r. TV and VCR	23.1	23.1	46.2	7.6
s. Easy access to a fax machine	76.9	7.7	0.0	15.4

In Brownsville ISD, the highest percent for connectivity, 28.9%, is "access to the school's local computer network from home." In the area of computer peripherals and software, the highest percentages in the data reflect access to external computer speakers, 43.2%, and printers, 32.4% in the classroom. The next highest percent, 27.0%, is "access to CD-ROM drives." The highest percent for access to other technology was 13.5% for having a "TV and VCR" in the classroom.

Data for McAllen ISD demonstrated that 16.7% of the respondents claim access to the school's local computer network from home. In the area for computers peripherals and software 16.7%, the highest percent in this area, was recorded for the following elements: Printers, CD-ROM drives, Jazz, Zip or similar drives, and computer projectors. 33.3% was recorded for access in the classroom for TV and VCR, which was the highest percent across the categories.

In Pharr-San Juan-Alamo ISD, only 7.7% of the responses claimed to have "access to the school's local computer network from home." However, high percentages in the computer peripherals and software give a more positive picture. The highest percent, 69.2%, was classroom "access to CD-ROM drives," and the second highest, 61.5%, to "access to printers in the classroom," and 38.5% of the respondents stated that they have access to software they can borrow to use at home and to DVD drives. The highest percent for other technology, 46.2%, was given to access to TV and VCR in their classroom.

Across the districts, Pharr-San Juan-Alamo and Brownsville had overall higher percentages for different levels of technology access at the classroom level. McAllen had the lowest percentages overall. In addition, the highest percentages were presented for the area of computer peripherals and software and other technology, with TV and VCR access having the highest percent in all three districts.

The third major component of support factors in this study is that of technical support. Item 7 in the 2005 Teacher Survey captures the level of technical support asking respondents to rank their answers according to four levels in a continuum, from "not provided" to "extremely well." This section of the study will analyze the availability of technical support by district.

Table 14 presents Brownsville's percentages of levels of technical support. The categories in this item vary from installation support to selection and acquisition of technology-related materials.

Table 14. Percentages of Levels of Technical Support as Provided by Brownsville ISD, McAllen ISD, and PSJA ISD (Item 7)

Skill	This is not provided	If provided, how well is the need for support met? Not at all well	Fairly well	Extremely well	No Response
		Brownsville (N=33)			
a. Installing equipment and materials	0.0	8.1	54.1	37.8	0.0
b. Troubleshooting and maintaining equipment and networks	10.8	10.8	51.4	27.0	0.0
c. Installing operating systems and software	2.7	8.1	51.4	37.8	0.0
d. Troubleshooting and maintaining operating systems and software	2.7	10.8	59.5	27.0	0.0
e. Helping teachers to integrate computer activities with curriculum (e.g., help in preparing lesson plans)	10.8	16.2	35.1	32.4	5.5
f. Selecting and acquiring computer-related hardware, software and support materials for schools	18.9	2.7	35.1	37.8.	5.5

Table 14 (continued)

Skill	This is not provided	Not at all well	Fairly well	Extremely well	No Response
	If provided, how well is the need for support met?				
McAllen (N=16)					
a. Installing equipment and materials	0.0	33.3	66.7	0.0	0.0
b. Troubleshooting and maintaining equipment and networks	0.0	41.7	58.3	0.0	0.0
c. Installing operating systems and software	0.0	33.3	66.7	0.0	0.0
d. Troubleshooting and maintaining operating systems and software	0.0	50.0	50.0	0.0	0.0
e. Helping teachers to integrate computer activities with curriculum (e.g., help in preparing lesson plans)	16.7	41.7	41.6	0.0	0.0
f. Selecting and acquiring computer-related hardware, software and support materials for schools	0.0	41.7	50.0	0.0	8.3
Pharr-San Juan-Alamo (N=13)					
a. Installing equipment and materials	15.4	15.4	61.5	7.7	0.0
b. Troubleshooting and maintaining equipment and networks	7.7	15.4	69.2	7.7	0.0
c. Installing operating systems and software	7.7	7.7	84.6	0.0	0.0
d. Troubleshooting and maintaining operating systems and software	15.4	15.4	69.2	0.0	0.0
e. Helping teachers to integrate computer activities with curriculum (e.g., help in preparing lesson plans)	7.7	30.8	61.5	0.0	0.0
f. Selecting and acquiring computer-related hardware, software and support materials for schools	7.7	30.8	61.5	0.0	0.0

In Brownsville the highest percentages were recorded in the fairly well to extremely well levels. The highest percentage in these levels, 59.5%, was for troubleshooting and maintaining operating systems and software, followed by 54.1% in the area of “installing equipment and materials.” Lower percentages in these two levels were in the areas of “supporting instruction by helping teachers to integrate computer activities with curriculum," 35.1%, and "selecting and acquiring computer-related hardware, software and support materials for schools."

In McAllen the data presented a split by almost half in the responses between fairly well and not at all well. The highest percent is 66.7% of responses that state that "installing equipment and installing operating systems" are done fairly well. However, in area e, "helping teachers integrate computer activities in the curriculum," there is a 41.7% in each of the levels for this item. Area f, "selecting and acquiring computer-related hardware, software, and support materials," there is a 41.7% for not at all well and 50% for fairly well.

The highest percentages for technical support in Pharr-San Juan-Alamo are in the fairly well level. The highest percent was for area c, "installing operating systems and software," 84.6%. Areas e, "helping teachers to integrate computer activities with curriculum," and f, "selecting and acquiring computer-related hardware, software, and support materials" had both favorable percentages at 61.5% in the fairly well level.

Across the districts, Brownsville ISD had the highest percentages in both the fairly well and extremely well levels in all categories. Both McAllen and PSJA percentages presented the lowest percentages in the extremely well, but were balanced in the areas of teacher support in the fairly well category.

Item 8 of the 2005 Teacher Survey was used to determine access to technology coordinators by schools. Table 15 presents the percentages of technology coordinators per school across districts.

Table 15. Percentage of Technology Coordinators Per School in Brownsville ISD, McAllen ISD, and PSJA ISD as Reported by Third Grade Teachers (Item 8)

Skill	Yes	No	I Don't Know	No Response
Brownsville (N=33)				
Is there a "technology coordinator" at your school	86.5	0.0	0.0	13.5
McAllen (N=16)				
Is there a "technology coordinator" at your school	75.0	16.7	0.0	8.3
Pharr-San Juan-Alamo (N=13)				
Is there a "technology coordinator" at your school	100.0	0.0	0.0	0.0

All three districts provide a high percentage of technology coordinators at the campus levels. Pharr-San Juan-Alamo ISD reported 100% access to technology coordinators in the schools. McAllen had the lowest percent, 75%, of access to technology coordinators.

The 2005 Teacher Survey asked respondents to list the most helpful resource they can access when they have questions regarding the use of educational technology for instruction. This was presented in item 10 of the survey. Each answer to this item was tabulated and categorized by district.

Table 16 presents the percentage of responses to each of the most useful resource listed in each questionnaire for all three districts.

Table 16. Percentages of Responses for "Most Useful Resource" in Brownsville ISD, McAllen ISD, and PSJA ISD as Reported by Third Grade Teachers (Item 10)

Please indicate where you go if you have questions regarding using educational technology for instruction.	Percent
Brownsville (N=33)	
no answer	54.1
computer lab manager	27.0
family and friends	27.0
family and friends & teachers	27.0
internet & teachers	54.1
internet technology support	54.1
librarian	54.1
librarian & media specialist	27.0
students	27.0
teachers	24.3
technology coordinator & teachers	8.1
technology coordinator	16.2
technology coordinator, friends & family	27.0
technology coordinator, teachers & technology specialist	27.0
technology specialist	8.1
technology specialist & family and friends	27.0
McAllen (N=16)	
no answer	16.7
Librarian	41.7
Teachers	8.3
technology coordinator	33.3
Pharr-San Juan-Alamo (N=13)	
Teachers	30.8
technology coordinator	38.5
technology specialist	7.7
Internet	7.7

In Brownsville ISD, the highest percent, 54.1% was recorded for three different resources: Internet and teachers, internet technology support, and the librarian. This was also the same percent recorded for No Answer. The next highest percent was 27.0%, and this was recorded for a number of "most useful" resources, including computer lab manager, family and friends, family, friends and teachers, librarian and media specialist, students, technology coordinator, and technology specialist. Due to the variety of responses it is difficult to provide an accurate statistical analysis for this item.

Responses to item 10 in McAllen were less varied, and provided a clearer picture of who the teachers perceive as a “most useful resource” regarding the use of educational technology for instruction. In McAllen, 41.7% of the responses to this item identified the librarian as the most helpful resource regarding the use of educational technology for instruction. The next highest percent was 33.3%, and these responses identified the technology coordinator as the “most useful resource” regarding the use of educational technology for instruction.

In Pharr-San Juan-Alamo ISD 38.5% of the responses identify the technology coordinator as the “most useful resource” regarding the use of educational technology for instruction. The second highest percent was 30.8%, presenting teachers as “most useful resources.” In this district, the lowest percentage for “most useful resource” was given to the technology specialist and the Internet.

Responses to item 10 are varied across the districts. Yet, in Brownsville and in McAllen, librarians had the highest percentages as the “most useful resources” regarding the use of educational technology for instruction. In McAllen and in Pharr-San Juan-Alamo, technology coordinators shared high percentage rates as the “most useful resources.”

The last item in the 2005 Teacher Survey that describes some kind of support for the practice of technology integration is item 11. Item 11 solicited information regarding the “response rate” when technology breaks down in the classroom. Table 17 presents the “response rate” by district.

Table 17. Percentages of Response Rate to Technology Breakdowns in Brownsville ISD, McAllen ISD, and Pharr-San Juan-Alamo ISD as Reported by Third Grade Teachers (Item 11)

When technology breaks down, how long does it typically take to fix the problem?	Rate					
	Less than 1 day	1-2 days	3-4 days	5 days or more	Not sure	No Response
Brownsville (N=3)	8.1	29.7	16.2	35.2	10.8	0.0
McAllen (N=16)	0.0	25.0	26.7	41.7	6.6	0.0
Pharr-San Juan-Alamo (N=3)	0.0	15.4	15.4	61.5	7.7	0.0

Brownsville ISD has the best percentage for response rate at 8.1% for a response rate of less than one day. McAllen and PSJA both have 0% at this rate. Brownsville has the next highest response rate, 29.7%, for a response rate of 1-2 days, followed by McAllen at 25.0%, and PSJA at 15.4%. PSJA has the highest response rate at the slowest rate of 5 days or more, 61.5%.

Research Question #4

To what degree is the integration of state technology application standards applied in planning of third grade reading instruction as reported by teachers in high-performing campuses in selected elementary schools in South Texas?

Data were gathered from responses to item 15 in the 2005 Teacher Survey. Responses to this item contain six areas grouped in two categories: Areas a and b relate to the familiarity with the technology TEKS and the use of technology TEKS in the planning of reading lessons. Areas c through f ask about the extent to which teachers integrate each Technology TEKS into the planning of their reading lessons. Table 18 presents each district data set to respond this research question.

Table 18. Percentages of Responses to the Familiarity and Use of the Technology TEKS in the Planning of Reading Instruction in Third Grade in Brownsville ISD, McAllen ISD, and PSJA ISD as Reported by Third Grade Teachers (Item 15)

Description	No or very little	Yes, somewhat	Yes, a lot	N/A	No Response
Brownsville (N=33)					
a. To what degree are you familiar with the technology applications TEKS for your grade level	24.3	54.1	21.6	0.0	0.0
b. To what extent do you use the state's technology applications TEKS in planning your lessons?	37.8	48.6	13.5	0.0	0.1
c. To what extent do you integrate technology in your lessons to help students demonstrate a basic understanding of culturally diverse written texts? (TEKS Reading Objective 1)	40.5	35.1	21.6	2.7	0.1
d. To what extent do students use technology in applying knowledge of literary elements to understand culturally diverse written texts? (TEKS Reading Objective 2)	24.3	59.5	13.5	2.7	0.0
e. To what extent are students able to use technology in a variety of strategies to analyze culturally diverse written texts? (TEKS Reading Objective 3)	37.8	45.9	13.5	2.7	0.1
f. To what extent do students use technology to apply critical-thinking skills to analyze culturally diverse written texts? (TEKS Reading Objective 4)	37.8	45.9	13.5	2.7	0.1
McAllen (N=16)					
a. To what degree are you familiar with the technology applications TEKS for your grade level	16.7	75.0	8.3	0.0	0.0
b. To what extent do you use the state's technology applications TEKS in planning your lessons?	41.7	58.3	0.0	0.0	0.0
c. To what extent do you integrate technology in your lessons to help students demonstrate a basic understanding of culturally diverse written texts? (TEKS Reading Objective 1)	66.7	16.7	8.3	0.0	8.3

Table 18 (continued)

Description	No or very little	Yes, somewhat	Yes, a lot	N/A	No Response
d. To what extent do students use technology in applying knowledge of literary elements to understand culturally diverse written texts? (TEKS Reading Objective 2)	50.0	50.0	0.0	0.0	0.0
e. To what extent are students able to use technology in a variety of strategies to analyze culturally diverse written texts? (TEKS Reading Objective 3)	50.0	50.0	0.0	0.0	0.0
f. To what extent do students use technology to apply critical-thinking skills to analyze culturally diverse written texts? (TEKS Reading Objective 4)	50.0	50.0	0.0	0.0	0.0
Pharr-San Juan-Alamo (N=13)					
a. To what degree are you familiar with the technology applications TEKS for your grade level	15.4	53.8	23.1	0.0	7.7
b. To what extent do you use the state's technology applications TEKS in planning your lessons?	46.2	15.4	23.1	7.7	7.6
c. To what extent do you integrate technology in your lessons to help students demonstrate a basic understanding of culturally diverse written texts? (TEKS Reading Objective 1)	30.8	38.5	7.7	7.7	15.3
d. To what extent do students use technology in applying knowledge of literary elements to understand culturally diverse written texts? (TEKS Reading Objective 2)	15.4	46.2	15.4	7.7	15.3
e. To what extent are students able to use technology in a variety of strategies to analyze culturally diverse written texts? (TEKS Reading Objective 3)	23.1	46.2	7.7	7.7	15.3
f. To what extent do students use technology to apply critical-thinking skills to analyze culturally diverse written texts? (TEKS Reading Objective 4)	23.1	46.2	7.7	7.7	15.3

In Brownsville ISD 75% (21.6%, yes, a lot and 54.1% yes, somewhat) of the respondents state to be familiar with the state's Technology TEKS, area a. 13.5% of the responses claim to use the technology application TEKS in planning their lessons. The highest percent rate was 21.6%, stating that they integrate technology in the lessons to help students demonstrate basic understanding of culturally diverse texts. The yes, somewhat category had the highest percent rates across the areas, indicating some level of technology integration and use of the technology application TEKS in their classrooms. The highest percent rate in the yes, somewhat category, 59.5%, was given to area **d**, the extent to which students use technology in applying knowledge of literary elements to understand culturally diverse written texts.

The highest percentages for McAllen ISD are in the yes, somewhat category and the no or very little category. The highest percentage, 75.0%, was in the area of familiarity, followed by the use of the state's technology application TEKS in planning lessons at 58.3%. However, the highest percent in all areas across all categories was 66.7%, describing no or very little integration of technology in lessons to help students demonstrate a basic understanding of culturally diverse written texts.

The highest percentages in the yes, a lot category in Pharr-San Juan-Alamo ISD were in the areas of familiarity and use of the state's technology applications in lesson planning, both percentages at 23.1%. As in the previous district, the highest percentages across the areas were documented in the yes, somewhat category, with the highest percent, 53.8%, for area a, familiarity with the technology applications TEKS for their grade level. The next highest percent was 46.2%, and this record was the same for the last three areas, d "students use of technology in applying knowledge of literary elements," area e, "students ability to use technology in a variety of strategies to analyze culturally diverse written texts," and f, "use of technology to apply critical-thinking skills to analyze culturally diverse texts."

Although this analysis reveals that the level of teacher technology skill level is a weak predictor of the level of integration of technology in the classroom, across districts there are significant differences in this relationship. Still further analysis revealed that there is a certain level of homogeneity in both teacher skill level and the level of integration of technology in the classroom, and in other variables.

Teachers from all three districts reported to be in the adaptation level or below in a number of variables, including their general familiarity with computers, the use of computers for a number of professional activities, and the integration of computers in their reading classes. Most teachers reported that they use technology predominantly to communicate with colleagues and to create instructional materials. Most of the responses demonstrate a certain level of familiarity with the technology applications TEKS for their grade level, and some use of the state technology applications TEKS in planning lessons.

Brownsville has most of the higher responses in all areas of technology skill, level of technology integration in the classroom, and technology support factors. Teachers in Brownsville reported a higher frequency of technology activities and skills in most of the variables. McAllen and PSJA have a variety of responses across the variables. However, McAllen appears to follow the same patterns as Brownsville; although with high percentages in lower areas of technology familiarity or technology integration or use. PSJA has high percentages in the areas of technology support and infrastructure, but yet, teachers report to have less familiarity or fluency in technological skills and integration of technology in the classroom.

Data from all three districts were both homogeneous in the level of responses, and varied in the rate of responses. Levels of variance were able to be determined through an analysis at the campus level. Nevertheless, a relationship between the variables could not be determined in this study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine what level of technology integration has the most impact on TAKS scores in selected high-performing third grade campuses in South Texas. This was accomplished by determining the degree of the relationship between and among the study variables. Where significant variation was noted, additional tests were conducted to assist in determining the underlying cause of variation.

The levels of technology integration were determined through an analysis of the literature. The analysis led to the identification of The Integrated Studies of Educational Technology Teacher Survey (AIR, 2002) as the instrument to collect data about the levels of technology integration in third grade reading classes. The survey was downloaded from the American Institutes for Research Website and re-typed to update for completion and return of survey instructions. The re-typed version of the survey was titled Teacher Survey 2005. Items 15 and 32 were written following the survey item format to capture data that were state-specific, including the Texas Academic Knowledge Skills objectives. Except for the completion and return instructions and items 15 and 32, the survey content was kept as the original. This survey was comprised of five criterion and 44 indicators, including school description, teacher technology proficiency, educational technology professional development, teacher integration of educational technology in teaching, and personal demographics.

For the purposes of this study, only items 2, 5, 7, 8, 10, 11, 14, 15, 31, and 32 from the 2005 Teacher Survey were used to answer the four research questions. Items 31 and 32 were used to determine the relationship between teacher skill level and the level of technology integration in the classroom. Item 14 was used to determine the extent to which technology is used in instruction with third grade students. Items 2, 5, 7, 8, 10, and 11 were used to identify the factors that support the practice of technology integration with third grade students in their reading classes. Finally, item 15 helped determine the degree of integration of the state technology application standards in planning third grade reading instruction. The survey was mailed to sample schools, and teacher data were gathered from the 2005 Teacher Survey. Reading scores from the Academic Excellence Indicator System (AEIS) Report (TEA, 2005) were gathered to determine school samples.

First, the strength of the relationship between the teacher technology skill level and the level of technology integration in the classroom were analyzed. Then, the level of difference was examined to determine variance first across districts, then among campuses. After a significant level of difference was found among campuses between teacher skill level and teacher level of technology integration, a correlation test was conducted to determine the strength of the relationship between these two variables. In addition, other variables were examined to identify possible reasons for the research findings, including factors that support technology integration, and the level of integration of the state technology application standards in reading lessons.

The research was conducted during the early spring semester of 2005. Reading scores from 2003 and 2004 were used to determine the sample. Districts were chosen randomly in South Texas, and schools were identified according to their reading scores within the identified districts. The superintendents of the districts were sent a letter explaining the nature and purpose of the study. After securing the district superintendent's permission, a phone call was made to the principals of the selected schools. Within a week of alerting principals of the study, packages containing a cover letter to the principal, to individual teachers, and copies of the survey were sent to each of the schools.

After the initial and follow-up correspondence, 62 teachers returned the survey establishing a response rate of 62%. It should be noted that the data collection procedures used in this study closely followed the procedures established by Gall et al., (2003), and the results may only be generalized to the population sampled.

Statistical analysis was applied to each of the four research questions. For the purposes of this study correlations, mean scores, standard deviations, frequencies, correlations, and analysis of variance (ANOVA) were used as part of the descriptive and inferential statistical analysis.

Conclusions

A number of conclusions regarding the level of technology integration, teacher technology skill level, the factors that support technology integration in the classroom, and the level of integration of the state's technology application standards and all of their possible effects on TAKS reading scores can be drawn based on the analysis of the study data as presented in Chapter IV. These conclusions are reached by studying the findings that are statistically significant. The conclusions are presented in reference to the four original research questions that guided this study.

Research Question #1

Research question #1 asked, “Is there a relationship between the levels of technology integration in reading instruction and the levels of teacher technology skills in third grade classes of high-performing campuses as reported by AEIS in selected elementary schools in South Texas?”

Findings

There was a positive relationship between the teacher skill level and the level of technology integration in the classroom across all 60 respondents. The Spearman Rho correlation coefficient was 0.50, which was significant at the 0.01 level. This means, that 75% of the variance was unaccounted for all participants (see Table 1). The analysis of the data across districts revealed that the three districts were relatively homogenous on both measures, that of teacher technology skill level and level of technology integration in the classroom (see Table 2). The data demonstrated that for teacher skill level, there was no significant difference. In the same manner, the data showed that the level of technology integration across districts was rather similar. However, when the analysis was conducted among campuses, that data reflected a significant degree of difference between campuses. Data on teacher skill level demonstrated that for the level of technology integration in the classroom. Due to the wide number of responses per campus, a post hoc test was not possible; and thus, it was not possible to statistically determine which schools differed at this point.

When the data were analyzed according to percentages, the results also demonstrated some level of homogeneity across districts. Although each district had some differences in the different variables, the teacher skill levels and the levels of technology integration were similar across districts. According to the percentages across districts, the highest level of skill levels and technology integration were recorded at the adaptation level.

Brownsville ISD had more adaptation level percentages across the variables. For teacher skill level, Brownsville teachers reported the higher percentages at the adaptation level in 9 out of the 13 variables. And, for technology integration, Brownsville teachers classified themselves to be at the adaptation level in 8 out of the 9 variables in item 32. In Brownsville, though very low, there were responses in all 13 variables of teacher skill.

McAllen reported a similar pattern, but at lower levels. More than half of the high percentages in McAllen were at the not familiar level. McAllen teachers reported to be at the entry level in item 32 integration of technology in the classroom. For PSJA, the data demonstrated a wide variety of percentages from the adaptation level and below, with a slight concentration at the adaptation and entry levels in teacher skills levels.

One explanation for these findings may be that we are witnessing a developmental progression in teachers' acquisition of knowledge and fluency regarding technology skills and technology integration in the classroom. As teachers' skill levels increase, technology integration in the classroom could increase. One might argue that teachers in these selected schools are progressing from one developmental stage to another. Ultimately, we believe that the value of a developmental viewpoint is to foster and to move forward such expeculation from a perspective that does not denigrate any genuine desire to integrate technology into literacy research and instruction (Reinking et al., 2000).

Implications for Practice

Although in education, time is of the essence, integrating technology into the reading classroom is a complex and lengthy proposition. At the moment, schools and districts not only need to equip classrooms with the latest technological innovations, but they must also train their teaching forces to make the best use possible of these innovations. To be able to obtain the best results, planners need to be able to manage time in many different and creative ways. Learning is a developmental process, and teachers' learning requires time to evolve through the different learning stages. At the same time, schools and districts face the crude reality of accountability systems that demand results immediately. Policymakers and school personnel need to come together to face a number of realities, including the need to accept that for technology to evolve from assimilation to accommodation processes in our classrooms, it takes time. In addition, schools and districts need to be aware of the changing nature of literacy and make adjustments in school systems to fit the this new phenomenon.

Research Question #2

Research question #2 asked, “To what extent is technology used in instruction with third grade students in high-performing campuses in selected elementary schools in South Texas?”

Findings

In order to answer this question, descriptive statistics were run utilizing the variable of the amount of time teachers use technology for professional activities. This calculation revealed percentages of the times teachers spend involved in a variety of professional activities divided in three major categories, including lesson design and instruction enhancement, administrative record keeping, and communications. A number of patterns were noted across districts (see Table 9).

Specifically, similarities were found present across districts in the daily use of technology for professional activities. Skill f, “to do administrative record keeping, (i.e., grades, attendance, etc.) had the highest percentage rate in all three districts with an average use of 57.9%. The second highest daily use was recorded to skill g, “to communicate with colleagues and/or other professionals,” with an average use of 26.6%. The next high percentage in daily use was skill a, “to create instructional materials (i.e., handouts, tests, etc.), with an average use of 11.9%. The district with the most recorded “daily use” skills was Brownsville, with daily use in 10 of the 11 skills. Both McAllen and PSJA recorded daily use only in 3 of the 11 skills. The next level of use was skills used “a few times a week.” This level of use presented a similar pattern as “daily” use. However, PSJA recorded high percentages in skills a, “to create instructional materials," b, "to gather information for planning lessons," and c "to access lesson plans." The lowest level of use "do not use technology for this activity" across districts was recorded in item i "to communicate with students outside of classroom hours," and item k, "to post/share student work on the Web." Another high area of "do not use technology for this activity" was item e, "to create multimedia presentations for the classroom."

Since the pattern of most frequent use of technology for professional activities appears in the areas of "administrative record keeping," and "communicating with colleagues," the following explanations are proposed. First, the schools integrate technological changes easier in the areas where impact can be easily measured. For administrative record keeping, the data are easily available by running electronic reports to be able to justify the use. In addition, training to use technology for administrative record keeping only involves the adults in the organization and can be easily monitored by implementing school-wide policies about record keeping. For example, a principal adopted a practice of conducting all logistical communications with his staff via email, thus eliminating the need for administrative discussions in staff meetings. This simple approach saved more than three hours in teacher and staff time per month (CEO Forum, 1999).

The data revealed seldom-to-low use in the areas of lesson design and instruction enhancement, and communications. Specifically, there is very low-to-no use of technology to communicate with parents and students and using the Web to post classroom assignments and student work. These areas require time to be able to search for information to enrich lesson design and relevant professional development to acquire teaching skills that involve a high level of technology integration in the classroom, involving students in different ways of interaction and learning. Consequently, another explanation for the low use of technology in classrooms in instructional areas is that teachers do not have the time to find and evaluate software and other computer applications. Computer software and applications training might not be offered at convenient times. Or, as in one example in the literature, although there were many district opportunities and on-site sessions to learn general computer skills, the generic training available was irrelevant to teachers' specific needs (Cuban, Kirkpatrick, & Peck, 2001).

Implications for Practice

Districts need to consider a variety of elements necessary to increase the level of technology use in the classroom, including assessing teachers' technology training needs and providing appropriate time for professional development. Teachers' technological skill levels are varied and need to be considered when designing a technology professional development plan that will serve a variety of skill levels. On-going professional development must be offered to allow teachers a variety of times to be able to increase their technological skills and find times that can be convenient to them. Professional development needs to include a number of technology activities beyond basic technological skills, including the use of technology as a tool for learning and communicating with a variety of audiences, and to create student work that can be created and posted on the Web. In addition, teachers need to be allowed time to collaborate and be able to search and select appropriate technology activities to be integrated into their classroom practice.

Research Question #3

Research Question #3 asked, "What factors support the practice of technology integration for third grade students as reported by teachers in high-performing campuses in selected elementary schools in South Texas?"

Findings

In order to answer this question, descriptive statistics were run utilizing a number of variables per item. The calculations revealed percentages of the times teachers claimed to receive a certain amount of support in a number of items. A number of patterns were noted across districts (see Tables 10-15). Six survey items were selected to analyze the factors that support technology use in the classroom. These six factors included teacher professional needs assessment in the area of technology in the classroom; access to computer connectivity, computer peripherals, and other technology; technical technology support, including installation and selection of a number of technology elements; availability of a technology coordinator on campus; useful individual resources, such as librarians, other teachers, friends, etc.; and response rate when technology breaks down. Research consistently supports these specific and district-level program characteristics that enable teachers to effectively utilize technology (Cradler, 1995).

The first of the selected variables examined in the study that identify factors that support the practice of technology integration in the classroom is needs assessment regarding technology professional development. The substantial investment in hardware, infrastructure, software, and content that was recommended will be largely wasted if K-12 teachers are not provided with the preparation and support they will need to effectively integrate information technologies into their teaching (PCAST, 1997).

Item 2 presented three components to this variable. The first component was a: for schools/districts to inquire from teachers about their needs for professional development. All three districts reported high percentages in this component (Brownsville, 91.9%; McAllen, 75%; and PSJA, 61.5%). However, percentages for the other two components of the needs assessment vary, b: assess the effectiveness of the technology-related professional development, and c: assess teacher proficiency in the use of technology as an educational resource. The percentages dropped considerably (see Table 10). Brownsville ISD had only a combined 64.9% in these last two components. McAllen ISD reported 50% for b and 41.7% for c. PSJA teachers reported only 15% for b and 30.8% for c.

One reason for this discrepancy between components may be that the structure of most public schools works against successful professional development for teachers. Teachers are offered a variety of opportunities for professional development, but there is very little school/district follow-up. Professional development in the use of technology in the classroom is particularly complex because the focus of attention is not on the technology, but on improving student learning through improvements in instructional practice (Coughlin & Lemke, 1999).

The second variable for factors that support the use of technology in the classroom is item 5: Access to computer connectivity provided by school/district, computer peripherals and software, and other technology. The data considered for this study was those components available in classroom only for teacher own use. The rapid growth of school technology infrastructure has led to the increased availability and use of computers in schools. Most students now have access to computers and the Internet in their classrooms, nearly all students have access somewhere in their schools, and a majority of teachers report using computers or the Internet for instructional purposes (Ansell & Park, 2003). Texas has made tremendous strides during the last half-decade in connecting schools to each other, to external resources, and to the Internet. Texas schools have been fortunate to have the support of the Texas legislature and the federal government in building the technology infrastructure for schools through direct funding, grants, and discounts. As a result of these resources, as well as local efforts, districts have begun to build the infrastructure that will allow students and teachers to make use of technology tools that are basic and necessary for educating students today and in the future (TEA, 2004).

Yet, the report from selected South Texas elementary schools depicts a very varied ability to access a number of technological elements. Access to school/district networks was reported only in Brownsville (28.9%) and McAllen (16.7%). Access to computer peripherals is also very varied. A reason for this variety can be that each district has a different technology implementation plan or vision. Consequently, the technology peripherals and software available to teachers will vary from district-to-district. The only peripherals with high percentages in classrooms across districts were printers (Brownsville, 32.4%, McAllen 16.7%, and PSJA 61.5%). Under the “other technology” element, TV and VCR received high percentages in McAllen (33.3%) and PSJA (46.2%). In the area of software that teachers can borrow to learn to use at home, zero or low response for no software available to borrow was reported for McAllen and PSJA, only Brownsville (18.9%) has software available for teachers to take home and review.

Although purchasing technology and its peripherals is relatively easy for districts and schools, the implementation of the innovation is very challenging. One reason why the implementation of technology is problematic is because it is not one innovation, but a combination of many related innovations, including hardware and multiple computer applications (Wetzel, Zambo, & Padgett, 2001).

The third variable for factors that support technology use in the classroom is item 7: technology support available to teachers. This area had the higher percentages in the “fairly well” and “extremely well” categories across the variables (see Table 12). Teachers reported that in the area of technical support, they receive support, including the installation of equipment and materials with Brownsville reporting a combined 91.9%, McAllen 66.7%, and PSJA 69.2%; troubleshooting and maintaining operating systems and software with Brownsville 86.5%, McAllen 50%, and PSJA 69.2%; and helping teachers to integrate computer activities with curriculum with Brownsville 67.5%, McAllen 41.6%, and PSJA 61.5%. Brownsville had the better percentages in all areas, with PSJA next, and McAllen teachers reporting about half in the “fairly well” and “not at all well” areas. Again, this support is more in the technical area of technology integration, and the trend appears to be the increased support for the development of technology infrastructure. However, it is encouraging to observe moderate percentages in the area of “helping teachers to integrate computer activities with the curriculum,” with Brownsville at 35.1%, McAllen at 41.7%, and PSJA at 61.5%.

Item 8 and item 10 are two related variables in the support factors category. Item 8 asked teachers if there was a technology coordinator on campus, and item 10 asked them what the most useful resources they consulted were when they faced technology challenges. All three districts reported high percentages in the area of having a technology coordinator, Brownsville 86.5%, McAllen 75%, and PSJA 100%. For item 10, teachers were asked to indicate all the choices they wished to list that applied to this question; consequently, the percentages reflect the rates of multiple responses. For example, in Brownsville 54.1% of teachers find useful help for technology questions in the Internet and the librarian, and 27% find it useful to seek help with the librarian or media specialist, students, family and friends, technology coordinator, etc. In McAllen and PSJA teachers find more useful to seek help from the librarian (41.7% in McAllen) and from the technology coordinator (38.5% in PSJA). In PSJA, teachers also find help from other teachers (30.8%).

The last variable in this category was item 11: Response rate time for technology breakdowns. There was a variety of responses for this item (see Table 15). Brownsville had the best response rate with 8.1% for less than one day and a combined

45.9% for one to four days. McAllen had the second highest for the combined one to four days rate, 51.7%; however, McAllen had no responses in the less than one-day category. PSJA had the slowest response rate with 61.5% for five days or more.

The data revealed that schools/districts are providing a number of support factors to support the use of technology in the selected elementary schools of this study. Although there are differences among the variables, the pattern is clear in terms of the efforts schools/districts are making to build a strong infrastructure for the use of technology at the classroom level. Teachers have access to basic support factors, such as connectivity, technical support, technology coordinators at the campus level, and a wide-array of useful resources from computer peripherals to individuals helping support technology use in their classroom.

Despite the high support for creating a strong technological infrastructure, there are still challenges to bring the full potential of technology into the classroom. Some skeptics list a number of reasons, including lack of teacher technical competency, rigid school structures, time constraints, defects in technologies, and competing educational priorities. Despite the dramatically increased presence of information technologies, however, the vast majority of students have school experiences remarkably similar to those of students in the previous 50 years (Peck, Cuban, & Kirkpatrick, 2002).

Implications for Practice

Integrating technology in the classroom is not a choice. Building more effective and efficient technological infrastructures should continue. However, there are a number of issues to be resolved in the area of enabling teachers to integrate technology in the classroom. For example, to the challenge of "lack of teacher technical competency," the solution is to find better and more effective ways to train teachers to use technology in the classroom. One strategy that has proven effective is co-teaching; that is, a working collaboration between teachers and technology integration specialists over the course of a school year (McNamara & Grant, 1998). As one innovation is introduced, others will follow. If creative ways to offer professional development are considered, then other challenges will also need to be resolved, including time, rigid school structures, and competing educational priorities.

Research Question #4

Research Question #4 asked, "To what degree is the integration of state technology standards applied in planning of third grade reading instruction as reported by teachers in high-performing campuses in selected elementary schools in South Texas?"

Findings

To answer this question, descriptive statistics were run utilizing a number of variables per item. The calculations revealed percentages of the level of frequency teachers claimed to utilize the Texas Essential Knowledge Skills (TEKS) in their reading lessons. A number of patterns were noted across districts (see Table 16).

Survey item 15 was used to analyze the frequency with which teachers use the TEKS in planning reading instruction.

The first two variables in item 15 asked teachers to report their familiarity and extent of use of the technology in addressing reading objectives from the TEKS, variables a and b. The great majority of teachers reported to be from “very familiar” to “somewhat familiar” with the technology TEKS. The combined percentage for each district was: Brownsville, 75.7%; McAllen, 83.3%; and PSJA, 76.9%. The next level of familiarity was in variable d, “the extent to which students use technology in applying knowledge of literary elements to understand culturally diverse written texts (TEKS, Reading Objective 2).” Brownsville reported 73%, McAllen 50%, and PSJA 61.6%. Similar responses were given to the other major reading areas of the standards. Clearly, teachers are familiar with the standards, and are making efforts to integrate technology while they teach the state standards.

The goal of the technology application TEKS is for students to gain technology-based knowledge and skills and to apply them to all curriculum areas at all grade levels. While the technology applications TEKS are specific to technology, it is expected that the TEKS at grades K-8 are not taught in isolation, but are the proficiencies necessary for integrating technology into the foundation and enrichment curriculum (TEA, 2004). Teachers in these selected schools report to be familiar with this concept of using technology to enhance the reading curriculum. The data demonstrated that teachers make an attempt to integrate technology in all four objectives of the reading TEKS.

Educators are the key to the effective use of technology in schools. It is only through change in classroom and school practice that the positive benefits of technology to learning will be realized. Teachers need visions of how technology can enhance and enrich learning opportunities for students in ways that were never before possible on a large scale – and they need time to explore these new approaches (Coughlin & Lemke, 1999).

Implications for Practice

Our education priorities need to be modified to allow for technology to flourish in our schools. High-stakes testing undermines the will teachers and schools have to infuse technology into the curriculum. Schools and districts need to be allowed more flexible structures to enable teachers to use a variety of strategies to integrate technology in the teaching of the state standards. As of this point, the paradox remains: a traditional paper-pencil assessment system vs. non-traditional technological learning will be a detriment to effective technology integration in the classroom.

Recommendations

Data collection, analysis, and examination led the researcher to a series of conclusions. The following recommendations are based on these research results and they are presented with the hope that additional data will be gathered by others to test the validity of each suggestion.

Recommendations Based on the Study

1. Since the data from the survey regarding teacher skill level and level of technology integration in the classroom demonstrate different levels of teacher technology use in the classroom, policymakers and administrators need to be able to plan professional development models that allow time and financial resources for teachers to participate in these efforts for an extended period of time. In addition, they need to implement professional development models that require a strong professional development assessment component.
2. The percentages examined regarding the use of technology for professional activities (high percentages limited to using technology to communicate with other colleagues and to create instructional materials) should encourage administrators to address professional development needs to include a number of technology activities beyond basic technological skills, including the use of technology as a tool for learning and communicating with a variety of audiences, and to create student work that can be created and posted on the Web. In addition, teachers need to be allowed time to collaborate and be able to search and select appropriate technology activities to be integrated into their classroom practice.
3. An examination to the percentages of the factors that support technology use in the classroom reveals that the integration of more efficient and

effective infrastructure components must continue in order to keep the technological systems in our schools updated.

4. This data also reveal that in order for teachers to become more technically "fluent," they need innovative ways of working as they learn to use technology via professional development models that include co-teaching and collaboration with other teachers.
5. An overall review of the data demonstrated that schools still do not have a clear understanding of how to integrate technology into the classroom; therefore, a realignment of educational priorities is needed to ameliorate the anxiety caused by high-stakes testing, and to enable teachers to explore other instructional strategies that allow for technology to be integrated into learning in a more meaningful way.

Recommendations for Future Study

1. Identify selected schools that have both a high technology usage and high reading achievement to study them for models to allow for models of technology integration in reading instruction.
2. Replicate this study analyzing teachers' skills in higher grade levels, including upper elementary grades, middle school, and high school.
3. Following the purposes of this study, develop research questions of a qualitative nature to provide another dimension to these findings.
4. Replicate this study analyzing classrooms with a different population, such as bilingual students, from a variety of ethnic backgrounds, etc.

5. Continue to develop teacher technology surveys that allow teachers to provide more specific feedback regarding technology professional development needs.
6. More investigation is needed to determine the specific reasons teachers with high levels of technology skills are sometimes reluctant to integrate technology into their classrooms.
7. Alternative professional development models need to be explored to be able to provide teachers with relevant professional development opportunities that will ensure the integration of technology into the classroom.
8. Identify school/district characteristics that are conducive to the integration of technology in the classroom.
9. Since one can argue that high tests scores in reading are of a cumulative nature, a longitudinal study needs to be conducted to explore the specific effects of technology integration in reading proficiency.
10. Furthermore, the findings of this research are extremely susceptible to policy misinterpretation. From this study, it may be construed that technology integration does not appear to make a difference for reading achievement, since virtually none of the high-performing schools reported substantive levels of technology integration. But such a conclusion cannot be drawn from this study since the design was non-evaluative. It was exploratory.

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APPENDIX A

SURVEY

Integrated Studies of Educational Technology Teacher Survey Fall 2004

Deadline: Day of the week, Month Day, Year

Return: Hilaria Bauer, 895 Dorel Drive, San Jose, CA 95132
or via the self addressed stamped envelope provided
If you have any questions please contact Hilaria Bauer at (408) 926-7169 or by e-mail at lalyblue61@aol.com

Note:

This survey has been modified from the original Teacher Survey Spring 2001 by SRI International, 1611 North Kent Street, Arlington, VA 22209.

To better understand the role and use of information technology in schools, the U.S. Department of Education has contracted with SRI International, The Urban Institute, and the American Institutes for Research to conduct liked studies on the availability and uses of educational technology among states, school districts, schools, and teachers across the country. Collectively, these research and evaluation efforts are referred to as the Integrated Studies of Educational Technology and will comprise one of the largest and most comprehensive national studies on the role of technology in American elementary and secondary schools to date.

This survey of teachers is designed to capture detailed information about the nature and adequacy of the professional development in educational technology available to teachers. For informed policy decisions experiences and opinions of teachers are critical. While you are not required to respond, your cooperation is needed to make the results of this survey of educational technology comprehensive, accurate, and timely. A copy of the final report will be made available to your district. Thank you for your participation in this study.

Definitions:
Educational Technology-A variety of technologies used to support instructions such as: computers, (laptops, desktops, etc.), telecommunications (Internet, Local networks, etc.), digital cameras, peripheral devices (printer, scanner, etc.), graphing calculators, and software.

Distance Learning-The transmission of information from one geographic location to another via various modes of telecommunications technology for educational purposes, including professional development.

Multimedia-Refers to the use of a computer to produce any combination of text, full color images and graphics, video animation and sound.

Self-Contained Classroom-A classroom where the teacher teaches all or most academic subjects to the same group of students all or most of the day.

Main Teaching Assignment-The activity at which you spend most of your time during the school year.

A. Please tell us about your school:

1. What is the name of your school? ________________________________

2. To the best of your knowledge, has there been any attempt in your school or district to do any of the following? **Choose one for each item.**

Has there been an attempt in your school or district to …	Yes	No	Don't know
a. …find out what teachers' needs for educational technology-related professional development are?			
b. …assess the effectiveness of the technology-related professional development offered by your school or district?			
c. …assess teacher proficiency in the use of technology as an educational resource?			

3. Approximately what percentage of your students had access to the following AT HOME as of June 30, 2003 (i.e., at the end of the 2003-2004 school year)? **Choose one per item.**

Percentage of students having HOME access to:	0-9%	10-49%	50-89%	90-100%	Don't know
a. Any type of computer					
b. Access to the Internet					

4. Please provide a general assessment of your students' basic technology skills. **Choose one for each item.**

	Most students have basic skills	Most students do not have basic skills	Don't know
a. Computers in general			
b. Word processing programs			
c. Spreadsheet programs			
d. Internet browses (e.g., Netscape)			
e. E-mail programs			

5. What kinds of educational technology has the school provided for you to use in your professional activities. **Choose ALL that apply.**

	Available in your school, all teachers may use	Available in your classroom primarily for your own use
Computers Connectivity		
a. Access to the schools' local computer network from home		
b. Access to the Internet from home, through a district Internet connection.		
Computers Peripherals and Software		
c. Software you can borrow to learn to use at home		
d. Printers		
e. CD-ROM drive		
f. Probes for collecting scientific data (e.g., temperature)		
g. DVD drive		
h. Jazz, Zip, or similar drive		
i. Microphones to use with computers		
j. External computer speakers		
k. Digital still camera		
l. Digital video camera		
m. A device to project computer screen for class viewing		
n. Scanner		
Other Technology		
o. Telephone		
p. Voice-mail account		
q. E-mail account		
r. TV and VCR		
s. Easy access to a fax machine		
Other, please specify:		

6. How many total computers, by type and location, were available for you to use during class time as of June 2004? If you are not sure, just make your best estimate. **Please fill in all boxes shaded in gray.** If there are no computers of the indicated type in a particular location, put a 0 in for the item.

TYPE OF COMPUTER (INCLUDING LAPTOPS)	NUMBER AVAILABLE IN					
	Your Classroom		Computer Lab		Library/Media Center	
	Number of computers	Number connected to the Internet	Number of computers	Number connected to the Internet	Number of computers	Number connected to the Internet
MACINTOSH						
Power MAC						
Other Apple/Macintosh						
PC						
Pentium with multimedia capabilities (e.g., sound card)						

7. What forms of technology support are available to you? How well is your school or district able to meet the need for specific types of technical support? **Choose one per item.**

Type of Technical Support	This is not provided	If provided, how well is the need for support met?		
		Not at all well	Fairly well	Extremely well
a. Installing equipment and materials				
b. Troubleshooting and maintaining equipment and networks				
c. Installing operating systems and software				
d. Troubleshooting and maintaining operating systems and software				
e. Helping teachers to integrate computer activities with curriculum (e.g., help in preparing lesson plans)				
f. Selecting and acquiring computer-related hardware, software and support materials for schools				

8. Is there a "technology coordinator" at your school? (i.e., someone on the school or district staff who is in the building regularly, if not daily, to coordinate teachers' instructional use of computers and help you or other teachers use computers).

Yes	No	Don't Know

9. Please indicate where you go if you have questions regarding using educational technology for instruction. **Choose all that apply.**

Where do you go with technology-related questions?	Choose ALL you have used
a. Your school Technology Coordinator	
b. Your school Library/Media Specialist	
c. Other teachers	
d. Technology specialists in the district that serve your school part time	
e. Representative from a hardware or software vendor	
f. The Internet (i.e., a technical support Website or chat room)	
g. Family and friends	
h. Students	
i. Other, please specify:	

10. Of the sources listed in question 9, please indicate the one that has been the most helpful to you by writing the line number below.

Most helpful: ______________________________

11. When technology breaks down, how long does it typically take to fix the problem? **Choose one.**

Less than 1 day	1-2 days	3-4 days	5 days or more	Not sure

B. Please tell us about your technology use:

12. Was instruction on how to use educational technology (either for preparing to teach or for use while teaching) a part of your teacher preparation program? **Choose on per item.**

Before you began teaching, were any of the following included in your teaching preparation program?	No or very little	Yes, some	Yes, A lot	N/A
a. Modeling of effective use of educational technology by faculty in your undergraduate teacher program courses				
b. Instruction in how to effectively use educational technology in teaching				
c. The requirement that some form of proficiency in using educational technology in teaching be demonstrated (e.g., an electronic portfolio, development of an instructional unit that incorporated technology)				

13. In general, how did you learn to use educational technology, either for you personal and professional use or for use in technology? **Please answer for each item, and to the right, please indicate how important each method was to your learning to use educational technology.**

☐ You have not learned or do not use technology at all (if checked, skip to question 15)

You learned to use educational technology through…	Yes	No	If yes, how much of an impact did this have on your learning to use educational technology? Slight Impact	Moderate Impact	Great Impact
a. …technology courses, workshops, or institutes sponsored by your district					
b. …technology courses offered by a local college or organization other than your school district					
c. …courses offered in your undergraduate or graduate training					
d. …teaching myself to use it					
e. …other teachers at my school					
f. …students at my school					
g. …family/friends					
h. …your own K-12 schooling					
i. Other, please specify:					

14. Please indicate how often you use technology when doing the professional activities listed below and for how many years you have been doing so. **Choose the appropriate frequency and indicate number of years for each item.**

	Frequency					How long?
How do you use educational technology in your professional activities?	Do not use technology for this activity	Less than once a month	A few times a month	A few times a week	Daily	Number of years since you began using technology for this activity
a. To create instructional materials (i.e., handouts, tests, etc.)						
b. To gather information for planning lessons						
c. To access model lesson plans						
d. To access information and research on best practices for teaching						
e. To create multimedia presentations for the classroom						
f. To do administrative record keeping, (i.e., grades, attendance, etc.)						
g. To communicate with colleagues and/or other professionals						
h. To communicate with students' parents						
i. To communicate with students outside of classroom hours						
j. To post homework or other class requirements, project information or suggestions						
k. To post/share student work on the Web						
l. Other, please specify:						

15. Please indicate to what extent, if any, there is integration of the technology standards in your lessons. **Choose the appropriate frequency and indicate number of years for each item.**

What extent, if any, is there integration of the technology standards in you lessons?	No or very little	Yes, somewhat	Yes, a lot	N/A
a. To what degree are you familiar with the technology applications TEKS for your grade level				
b. To what extent do you use the state's technology applications TEKS in planning your lessons?				
c. To what extent do you integrate technology in your lessons to help students demonstrate a basic understanding of culturally diverse written texts? (TEKS Reading Objective 1)				
d. To what extent do students use technology in applying knowledge of literary elements to understand culturally diverse written texts? (TEKS Reading Objective 2)				
e. To what extent are students able to use technology in a variety of strategies to analyze culturally diverse written texts? (TEKS Reading Objective 3)				
f. To what extent do students use technology to apply critical-thinking skills to analyze culturally diverse written texts? (TEKS Reading Objective 4)				

16. Do you have…

	Yes	No
a. …a computer at home?		
b. …Internet access at home?		

17. Please indicate to what extent, if any, the following are barriers to your use of educational technology. **Choose one for each item.**

To what extent, if any, are the following barriers to your use of educational technology?	Not a barrier	Small barrier	Moderate barrier	Great barrier
Hardware/Peripherals				
a. There aren't enough up-to-date computers in your school/classroom				
b. There aren't enough computers connected to the Internet in your school/classroom				

c. You don’t have needed accessories: printers, projectors, zip-drives, etc.				
Internet Resource Quality				
d. Students can’t access Web sites during the school day				
e. Students do not have adequate access to technology outside of school				
f. Students do not have adequate access to the Internet outside of school				
g. Internet connection isn’t fast enough for use while teaching				
h. Internet connection isn’t reliable enough, the network is frequently down				
i. There’s a lack of age-appropriate/educationally relevant Web sites				
j. There’s concern about student access to inappropriate materials on the Web				
Software Resources				
k. Your school has not acquired appropriate software resources				
l. There’s a lack of educationally relevant software products				
m. There’s a lack of software products aligned with your curriculum standards				
n. If you want relevant software, you have to purchase it yourself				
Logistical/Other Barriers				
o. There’s not enough time in the school schedule for students to do technology-related activities				
p. You don’t have time to develop the activities/lessons that use technology				
q. Inadequate technical support/advice for educational technology use				
r. There is a lack of support from administrators for educational technology use				
s. Inadequate training opportunities for teachers in educational technology use				
t. Lack of release time to learn/practice/plan ways to use educational technology				
u. Students do not have the needed skills to use technology				

C. Please tell us about your technology-related professional development activities

Questions 18-23 refers to technology-related professional development activities. Formal means the activity was organized, scheduled, and you committed to participating for a specific time period.

18. Please indicate all formal technology-related professional development that you participated in over the past year, meaning the 2003-2004 school year and including the summer of 2004. If you participated in activity, please indicate the number of hours, and to what extent it prepared you to use educational technology
Do not report professional development not related to technology (e.g., reading), but do report professional development activities in specific subject areas that <u>included</u> how to use educational technology in a particular subject. We are treating these categories independently, so please report hours for each professional development activity under one category only.

Did you participate in or lead any of the following types of formal professional development activities related to technology?	Yes	No	How many hours?	To what extent did it prepare you to use educational technology in teaching?			
				Not at all	A small extent	A moderate extent	A great extent
a. Within-district workshops or institutes focused on a specific topic, provided by or within the district							
b. Out of district workshops or conferences, focused on a specific topic, provided outside of the district							
c. Courses for college credit							
d. Participating in an on-line course							
e. Committee, task forces, or study groups focusing on technology skills and/or curriculum							
f. Activities resulting from a partnership between your school and another school (within your district or across district lines) that focused on educational technology							
g. Coaching or mentoring arrangements designed to provide one-on-one technology-related instruction							
h. Other, please specify:							

19. Which of the following technology-related skills were emphasized in the formal professional development you participated in over the past year? **Choose one for each item.**

Technology skill emphasized in professional development	Topic not covered	If covered, how much emphasis?		
		Low	Moderate	High
a. Using word processing programs				
b. Using spreadsheet programs				
c. Using database programs				
d. Using drawing, painting, or image editing program				
e. Using desktop publishing or presentation programs (e.g., PowerPoint)				
f. Using multimedia programs (e.g., Hyperstudio)				
g. Using reference information on CD-ROM				
h. Using Internet browsers (e.g., Netscape)				
i. Using E-mail programs				
j. Using Web page creation programs (e.g., FrontPage)				
k. Using integrated learning systems (e.g., Jostens, CCC)				
l. Using skills practice/tutorial programs				
m. Trouble-shooting				
n. Other, please specify:				

20. Which of the following topics related to integrating educational technology into instruction were emphasized in the formal professional development you participated in? **Choose one per item.**

Integration of educational technology topic emphasized in professional development	Topic not covered	If covered, how much emphasis?		
		Low	Moderate	High
a. Helping students meet state and/or district technology				
b. Using technology to teach in your primary content area				
c. Creating lesson plans that incorporate technology and the Internet				
d. Using software or technology activities that have already been developed				
e. Using technology to teach basic skills and facts through drills, tutorials, and learning games				
f. Using technology to promote active learning (e.g., using hands-on activities or guided discovery)				
g. Using technology to promote critical thinking				
h. Using technology to make possible collaborative activities with experts or other classes in other places				
i. Using technology to assess student work (e.g., portfolios)				
j. Using technology to analyze student assessment results (e.g., state/district assessment data)				
k. Other, please specify:				

21. To what extent has formal educational technology-related professional development increased the following? **Choose one per item.**

Did formal educational technology-related professional development increase…	To what extent increased?		
	Not at all or very little	To some extent	A great deal
a. …your overall ability to incorporate technology into your teaching			
b. …your knowledge about and ability to use computers in general			
c. …your interest in using computers			
d. …your use of computers for communicating with parents, colleagues, and students, and in preparing to teach			
e. …your ability to develop computer-based activities for student use			
f. …your ability to use new teaching methods involving computer technology (e.g., on-line, projects, simulations)			
g. …your ability to use technology to teach basic skills and facts through drills, tutorials, and learning games			
h. …your ability to use technology to make possible collaborative activities with experts or other classes in other places			
i. …your classroom management strategies			
j. …the critical thinking skills you try to develop in your students			
k. …your students' academic achievement			
l. …the way you assess student work			
m. …your ability to find resources such as lesson plans on the Internet			
n. Other, please specify:			

22. Which of the following types of incentives are available to you for participation in educational technology-related professional development? **Choose all that apply.**

a. ☐ Release time from classes and/or other responsibilities

b. ☐ Scheduled time in contract for professional development

c. ☐ Stipends, tuition or fee reimbursement

d. ☐ Credits towards recertification

e. ☐ Salary increments or pay increases

f. ☐ Recognition or higher ratings on an annual teacher evaluation

g. ☐ Additional resources for you or your classroom (e.g., hardware, software)

h. ☐ None of the above

i. ☐ Other, please specify:

____

____

23. What were your reasons for participating in formal educational technology-related professional development? **Choose all that apply.**

a. ☐ Your state requires educational technology training for teachers

b. ☐ Your school/district requires educational technology training for teachers

c. ☐ Your school/district encourages educational technology training for teachers

d. ☐ You need training to meet school/district technology competency standards for teachers

e. ☐ You chose educational technology training to fulfill a general professional development hours requirement

f. ☐ To learn technology skills to incorporate into/enhance your teaching practice

g. ☐ To learn technology skills to help you be more efficient

h. ☐ Personal interest in the topic

i. ☐ Because of incentives such as hardware, salary increase, release time, etc.

j. ☐ Other, please specify:

____

____

Questions 24-26 refers to informal technology-related professional development activities. Informal means the activity was not led or planned by an individual or group, not scheduled in advance, and you did not need to commit to participation for a specific time period.

24. Please indicate all informal technology-related professional development that you participated in over the past year, meaning the 2003-2004 school year and including the summer of 2004. If you participated in an activity, please estimate the number of hours, and to what extent it prepared you to use educational technology
Do not report informal professional development not related to technology (e.g., reading), but do report professional development activities in specific subject areas that included how to use educational technology in a particular subject.
We are treating these categories independently, so please report hours for each professional development activity under one category only.

Did you participate in the following types of informal, technology-related professional development?	Yes	No	How many hours?	To what extent did it prepare you to use educational technology in teaching?			
				Not at all	A small extent	A moderate extent	A great extent
a. Individual learning in which you read journals or other professional publications, browsed the Internet for materials, etc.							
b. Went to Websites to get information/materials about educational technology							
c. Informally worked with peers, family, or friends on skills related to technology in teaching							
d. Participated in on-line networks or chat-rooms with other teachers							
e. Visited an actual teacher resource center or professional development center which is staffed by lead or resource teachers and provides professional development materials/instruction							
f. Other forms of informal professional development related to the use of technology in teaching, please specify: If you answered "No" on all lines a-f, please skip to item 25.							

25. To what extent has informal educational technology-related professional development increased the following? **Choose one per item.**

Did informal educational technology-related professional development increase…	To what extent increased?		
	Not at all or very little	To some extent	A great deal
a. …your overall ability to incorporate technology into your teaching			
b. …your knowledge about and ability to use computers in general			
c. …your interest in using computers			
d. …your use of computers for communicating with parents, colleagues, and students, and in preparing to teach			
e. …your ability to develop computer-based activities for student use			
f. …your ability to use new teaching methods involving computer technology (e.g., on-line, projects, simulations)			
g. …your ability to use technology to teach basic skills and facts through drills, tutorials, and learning games			
h. …your ability to use technology to make possible collaborative activities with experts or other classes in other places			
i. …your classroom management strategies			
j. …the critical thinking skills you try to develop in your students			
k. …your students' academic achievement			
l. …the way you assess student work			
m. …your ability to find resources such as lesson plans on the Internet			
n. Other, please specify:			

26. What other educational technology-related support do you need? **Choose all that apply.**

a. ☐ List of popular software/Websites

b. ☐ Information about the quality and effectiveness of software/Websites

c. ☐ More support from administrators to obtain software

d. ☐ Pre-made activities that fit with the curriculum I teach

e. ☐ Time to practice and learn

f. ☐ An on-site support person to help me learn to incorporate technology into teaching

g. ☐ Other, please specify:

____

____

h. ☐ None

27. Would you be willing to participate in more professional development in educational technology? **Choose one.**

a. ☐ Yes (go to question 28)

b. ☐ No (go to question 29)

28. What other educational technology-related support do you need? **Choose all that apply.**

a. ☐ 1-9 hours

b. ☐ 10-29 hours

c. ☐ 30-59 hours

d. ☐ more than 60 hours

e. ☐ Other, please specify:

____

____

29. What are your reasons for not being interested in participating in professional development in educational technology at this time? **Choose all that apply.**

a. ☐ You prefer teaching with traditional tools

b. ☐ You know all you need to know about technology

c. ☐ You do not have adequate hardware/software to make training worthwhile

d. ☐ You have the hardware/software, but you do not have time to prepare new activities that utilize it

e. ☐ You have too many other time commitments to attend any more technology-related professional development activities

f. ☐ Your needs for professional development are greater in other areas than in educational technology

g. ☐ You are not paid for the time you spend in technology-related professional development

h. ☐ You have to pay for technology-related professional development yourself

i. ☐ Other, please specify:

____

____

D. Please tell us about you technology use in teaching:

30. In your opinion, how well prepared are you to use computers and the Internet for classroom instruction? **Choose one.**

a. ☐ Not at all prepared

b. ☐ Somewhat well prepared

c. ☐ Moderately well prepared

d. ☐ Very well prepared

31. Based on the following scale, please rate your skill level in each of the following applications. **Choose one response for each row.**
Entry-You are just beginning to learn the basic skills and are aware of the possibilities, but you do not use often in your teaching practice.
Adaptation-You are familiar with a variety of uses of this, and often use to support your existing classroom practices and teaching strategies.
Transformation-Use of this tool has significantly changed your classroom practice; because of it you have crafted new curricula and new teaching and learning techniques.

Please rate your skill level in each of the following applications	Not familiar with/don't use	Entry	Adaptation	Transformati on
a. Computers in general				
b. Word processing programs				
c. Spreadsheet programs				
d. Database programs				
e. Drawing, painting, or image editing programs				
f. Desktop publishing or presentation programs (e.g., PowerPoint)				
g. Multimedia programs (e.g., HyperStudio)				
h. Reference information on CD-ROM				
i. Internet browsers (e.g., Netscape)				
j. E-mail programs				
k. Web page creation programs (e.g., FrontPage)				
l. Integrated learning systems (e.g., Jostens, CCC)				
m. Skills Practice/Tutorial programs				
n. Other, please specify:				

32. Using the scale above, please indicate your skill level integrating technology in the classroom to help students achieve the following TEKS. **Choose one per item.**

Please rate your skill level of integrating technology in each of the following TEKS applications	Not familiar with/don't use	Entry	Adaptation	Transformation
a. Students are able to use technology to increase strategies for word documentation.				
b. Students use technology to read a variety of texts.				
c. Students use technology to develop vocabulary.				
d. Students use technology to better reading comprehension.				
e. Students use technology to analyze the characteristics of various types of texts; including character analysis, the importance of setting, and the development of the plot.				
f. Students use technology to represent text information in different ways; including story maps, graphs, and charts.				
g. Students use technology to read and comprehend a variety of text genres; including lists, newsletter, signs, etc.				
h. Students use technology to demonstrate their understanding of text applying critical-thinking skills; including making inferences, predictions, distinguishing between fact and opinion, etc.				

33. How often do students work in the following configurations when using educational technology during your class? Think of educational technology broadly, as including computers, the Internet, graphic calculators, etc. **Choose one per row.**

How often do students work in the following configurations with computers or graphing calculators?	How often do students work in this configuration?						
	Never	1-2 times per school year	3-5 times per school year	About once a month	About twice a month	About once a week	Daily
a. Whole class together, one student per computer							
b. Whole class together, students work on computers in pairs							
c. Whole class together, students work on computers in groups of 3-4							
d. Students take turns doing the activity, students working individually at the computer							
e. Pairs of students take turns doing the activity.							
f. Groups of 3-4 students take turns doing the activity							
g. Students must use a computer outside the classroom to complete assignments							
h. Students must use the Internet outside the classroom to complete assignments							
i. Other, please specify:							

34. How essential is your use of educational technology, in general, to your teaching practices? When answering, consider the relative impact on your teaching practice if computers were no longer available for your use. **Circle the corresponding number.**

Not at all essential	Somewhat essential	Essential	Extremely essential
1	2	3	4

35. The following is a list of changes that might not occur in teaching as a result of increased use of educational technology. Please indicate if any of the changes have occurred in your teaching as a result of your use of educational technology by indicating if you disagree or agree with each of the following statements. **Choose one per item.**

As a result of using educational technology in teaching:	Strongly disagree	Moderately disagree	Moderately agree	Strongly agree	N/A
a. I need longer blocks of instruction time/longer periods					
b. Students work more collectively with one another					
c. I find myself in the role of coach or advisor in the classroom more often than I used to					
d. Students get so wound up, it is difficult to get them to settle down afterwards					
e. I have gained skill in orchestrating multiple parallel activities in the classroom					
f. Students can cheat more easily-copying work and turning it in as their own					
g. I am more reflective about basic teaching goals and priorities					
h. I have students work independently more (i.e., explore a topic on their own work)					
i. I feel like I give up too much instructional responsibility to the computer software-like I’m not really teaching					
j. Students use computers in order to avoid doing more important work					
k. Often too many students need my help at the same time					
l. I have changed the way I organize classroom activities					
m. I rely less on textbooks					
n. I am better able to meet the needs of students with varying needs (e.g., low achieving or “gifted” students)					
o. Other, please specify:					

E. Please tell us about you:

36. What is your average class size? ____________

37. Please indicate the type of teacher certification you have and in what year it was received. **Choose all that apply.**

Type of teacher certification received: Year

a. ☐ State teacher certification ____________

b. ☐ Emergency/provisional certification ____________

c. ☐ No certification ____________

d. ☐ Other, please specify:

____ ____________

38. Including this year, how many total years have you been employed as a full or part-time teacher? *(Include years spent teaching in public and private schools.)* Years ____________

39. Please indicate your level of formal education and in what year you earned your degree(s). **Choose all that apply.**

Degree earned: Year

a. ☐ Associate degree or vocational certificate ____________

b. ☐ Bachelor's degree ____________

c. ☐ Master's degree ____________

d. ☐ Master's +30 units ____________

e. ☐ Doctorate (Ph.D. or Ed.D.) ____________

f. ☐ Other, please specify:

____ ____________

40. What is your gender? ☐ Male ☐ Female

41. In what year were you born? 19__________

42. What is your ethnicity? **Choose one.**

a. ☐ Hispanic or Latino

b. ☐ Not Hispanic or Latino

43. What is your race? **Choose ONE.**

a. ☐ American Indian or Alaska Native

b. ☐ Asian

c. ☐ Black or African American

d. ☐ Native Hawaiian or Other Pacific Islander

e. ☐ White

44. **(Optional).** Please share with us any comments regarding the use of educational technology in your school or about this survey.

APPENDIX B

PERMISSION

Name
School
Address

Date

Dear Principal's name:

On _____________, permission was granted by __(superintendent's name)__, to research and learn more from elementary teachers about the integration of technology during reading instruction in high-performing classes. Your school was selected as one of the research sites.

As a doctoral student in the Department of Educational Administration at Texas A&M University, my primary dissertation purpose is to examine the integration of technology as an instructional tool in third grade reading lessons, and how their use affects academic achievement as reflected by TAKS scores. This kind of data will allow administrators to make better financial and curricular decisions regarding the use of technology on your campus and district-wide.

Your school was selected because it has been identified as exemplary by the state, and/or has TAKS reading scores above 85% at the third grade level. Your district, and other educators across the nation will use the findings from this study to determine the future of the use of technology implementation in reading classes at the elementary level. The names of your teachers have been requested for follow up purposes to maximize the rate of return and ensure validity of the information; however, their responses will be kept confidential. Summaries at the campus and district level will be made available for your review through the district office.

(Superintendent's name) has reviewed the study's proposal and has granted permission for your school to participate in this study by allowing your teachers to answer the enclosed questionnaires. The instrument is divided into five sections and can be answered by marking your selected responses, and a few short answers.

Please distribute questionnaires by (date), and remind teachers to return them to me in the enclosed self-addressed stamped envelopes by:

Hilaria Bauer
895 Dorel Dr.
San Jose, CA 95132

Should you have any questions, feel free to contact me at hilaria.bauer@arusd.org or (408) 928-7506 at work, or (408) 926-7169 at home.

Thank you for your time and cooperation,

Sincerely,

Hilaria Bauer

APPENDIX C

LETTER EXPLAINING STUDY

Date

Ms. Yolanda Chapa
Superintendent
Mc Allen ISD

Dear Madam:

My name is Hilaria Bauer. I am a doctoral student at Texas A&M University, and I intend to research the topic of my dissertation using four of the major border districts including yours. I am interested in researching the correlation between the integration of technology at the classroom level and high reading achievement as perceived by third grade teachers. I will be using two kinds of data: The standardized test scores for years 2002, 2003, and if possible 2004. In addition, I would like to administer a teacher questionnaire in selected elementary schools.

I have identified some of your schools as high achieving in reading following standardized test data from 2002 and 2003. I would like to contact the principal of each school, explain the focus of the study, and administer the questionnaire to selected third grade teachers. Responding to the questionnaire takes about thirty minutes. I have planned to mail the hard copies of the questionnaire and follow up with the principal or his/her designee to collect the completed questionnaires. All responses are confidential, and the findings of the study will be shared with your district in terms of patterns found regarding the integration of technology, and reading instruction.

If you agree to my request, please sign and return the enclosed memo. I have enclosed a self-addressed and stamped envelope for your convenience. If your have further questions, you can reach me at:

(408)926-7169 home
(408)928-7506 work
(408)712-0648 cell
or at hilaria.bauer@arusd.org

Thank you for your consideration.

Sincerely,

Hilaria Bauer
TAMU student

APPENDIX D

CONSENT FORM

MEMORANDUM

TO: THIRD GRADE TEACHER

from: Hilaria R. Bauer
subject: Consent Form
date: 11/28/2005

I herby request your consent to participate in the study entitled:

The Relationship Between Technology Integration Reading Instruction and Reading Achievement in High-Performing Campuses as Reported by PEIMS and Third Grade Classroom Teachers in Selected South Texas School Districts

You are asked to respond to the attached questionnaire. Please make sure you respond to all questions. If you do not know or it does not apply to your practice, please indicate answering "don't know" or "N/A."

Please sign this form to confirm your consent to participate in this study. All responses will be confidential. Your name has been requested to monitor questionnaire return. Thanks for your cooperation.

____

Name

___________________________________ __________

Consent Signature Date

VITA

Hilaria Bauer
895 Dorel Dr.
San Jose, California 95132

EDUCATION

2005	Doctor of Philosophy, Educational Administration Texas A&M University, College Station, Texas
1991	Master of Arts, Bilingual/Bicultural & ESL Studies The University of Texas at San Antonio, San Antonio, Texas
1983	Bachelor of Arts, English-Communication Arts St. Mary's University, San Antonio, Texas

CERTIFICATION

2002	Professional Clear Teaching Credential Multiple Subject, State of California
2001	Preliminary Administrative Credential, State of California
1995	Management Certificate, State of Texas
1987	K-8 Teaching Credential, State of Texas

EXPERIENCE

2001-Present	Principal, Fischer Middle School, Alum Rock Union Elementary School District, San Jose, California
1996-2000	Educational Associate, Intercultural Development Research Association, San Antonio, Texas
1992-1995	Bilingual Coordinator, Adams Elementary, Harlandale Independent School District, San Antonio, Texas
1987-1991	Bilingual Teacher, Adams Elementary, Harlandale Independent School District, San Antonio, Texas
1985-1987	Bilingual Teacher, Dilley Independent School District, Dilley, Texas
1983-1985	Public Information Officer, KMOL-TV Channel 4, San Antonio, Texas

This dissertation was typed and edited by Marilyn M. Oliva at Action Ink, Inc.